Insects

PART 12—Tabanidae

BY

R. SENIOR-WHITE,
F. E. S., F. R. S. T. M. & H.
Honorary Correspondent, Zoological Survey of India, Malariologist, Bengal-Nagpur Railway.

Issued under the authority of the Government of India.

CALCUTTA GOVERNMENT OF INDIA
CENTRAL PUBLICATION BRANCH
1927

Catalogue of Indian Insects.

PART 12.—TABANIDAE.

INTRODUCTION.

A systematic catalogue may be one of three kinds. It may summarize chaos, may mark a stage in the development of our knowledge of a group, or it may be the logical outcome of a finished and "final" revision. Of those in the first category, the immortal "*Catalogue of the Diptera of South Asia*," by van der Wulp, is a classical example, whilst the writer's "*Bombyliidæ*" in the present series is a type of the third, although in few groups of plants or animals can it be said as yet that our systematic knowledge is approximately complete. The present part of the "*Catalogue of Indian Insects*" falls into the second category, summarizing the second stage in our knowledge of the family Tabanidae in India. The first revision of the family was published by Miss Ricardo fourteen years ago. Odd species have been described by various authors and stray pieces of additional synonomy made out. As a basis for further, intensive, work on the family the present time is a convenient one to "take stock". The result shows how fragmentary our knowledge is. The very uncritical list of species in the three principal genera of the family throughout the World, recently published in "*Genera Insectorum*" by de Surcouf, shows 170 species of *Hæmatopota*, 1,110 of *Tabanus* and 200 of *Chrysops* as known. Allowing for these figures being somewhat too large owing to yet un-effected synonymising, the Indian list of 31 *Hæmatopota*, 75 *Tabanus* and 11 *Chrysops* appears remarkably poor. Seven other genera, three of them peculiar to the Region, with one or two species each, bring the Indian total in the family up to 126 species, but only the genus *Hæmatopota*, the Indian species of which are 18 per cent. of the World total, indicates that here the present-day knowledge of the genus has kept pace with work in other areas. And yet this genus is probably the worst known of the major three in India, in the sense that more forms of it remain to be discovered than in the other two. However if I am correct in this belief, then the Indian fauna of *Tabanus* and

and Pathankot), contain two undescribed species in Groups IV and V of the genus.

From the foregoing, then, it is clear that an enormous amount of more work has still to be done before the *Hæmatopota*-fauna of India is properly known, and the necessary additions to our knowledge can be made by anyone who will take the trouble to collect specimens and send them in for determination.

Turning now to *Tabanus*, we see a very similar state of ignorance. The Indo-Gangetic Plain East and Burma each contain twenty known species, whilst Rajputana yields not a single record, and Central India only one, being the locality given for a type by Walker three-quarters of a Century ago! Leese collected at least three undescribed species at Mohand, and the writer has recorded (*Mem Dept. Agric India*, vii, 106), an unidentified species from Chakrata in the Western Himalaya.

From the table it will be seen that Group I in the genus is mainly confined to intruders from the Palearctic Region, to which Seistan really belongs, and it is possible that some of these species do not enter India proper at all. None the less, as Surra in that zone is of great importance, and its control an Indian problem, these species have been included in the key and the body of the Catalogue

The peculiarly coloured species of Group II seem to be inhabitants of hill regions and the country at their feet.

In the small Group III the only true Indian species, *ditæniatus*, is more widely distributed in Africa than it is in Asia, but covers a larger area of the Old-World Tropics than any other species of the family, extending to China, where its only Eastern relative is found *T. sufis*, in this Group, is Palearctic, and just enters the Region in the Western Punjab.

Group IV are mainly Plains species.

The species of Groups V and VI, with strikingly marked wings, are Malayan, only entering India in zones with strong affinities with that sub-Region.

Group VII contains most of the commonly and widely distributed species, as well as some localized rarities. Most of the species extend into Malaysia.

Group VIII is very poorly represented in India It is Malayan, and its few Indian members are found in zones with strong affinities with Malaya

The Indian species of Group IX have little affinity with further East, and are centered in India. *T rubicentris* and *T. orientis* are widely distributed in North India. The known Indian distribution of *T. khasiensis*, the Khasia Hills and Meerut, is an excellent illustration of

our lack of knowledge. The two localities have little in common save that they are both Oriental! There is a species not shown in the distribution table, peculiar, apparently, to the Nicobar Islands.

About half the species in Group X are purely Malayan. Those found in India are, as regards the zones in which they occur, distinctly of Malayan affinity, and some of them extend beyond the confines of the Empire eastward. One of the only two Tabanidae known from the Andamans belongs to this Group, the species occurring also in Ceylon, Burma and Sumatra.

The sub-genus *Therioplectes*, Group XI, is purely Western Himalayan and an intruder from the Palearctic.

The genus *Chrysops*, table III, is probably better known than the two previous, owing to the striking appearance of these insects. Only one species, *dispar* Fb., is commonly and widely distributed, and it probably occurs throughout the sub-Region, except in the North West. *C. flavocinctus*, *fasciatus* and *fixissimus* are Malayan species only found in India in localities strongly associated faunistically with further East. *C. flavipes* is a Palearctic species not entering India proper, and *C. mlokosiewiczi* is a Chinese species found in Yunnan, to which the last remark also applies. The remaining species are of localized distribution, or are found in similar stations, such as hilltops. No species are known from Rajputana and the Eastern Himalaya.

In spite of their importance, not only as probable carriers of Surra, but as worriers of domestic animals in general, it will thus be seen that our knowledge, systematic and geographical, of the Tabanidae is fragmentary in the extreme. If the present volume stimulates Veterinary Officers to accumulate material, which is easily done, as the flies do not have to be searched for, but are to be found on their patients for the looking, it is hoped that within a few years a very different Catalogue, especially zoo-geographically, may become not only possible but necessary.

In conclusion, the writer has to express his great obligation to Miss G. Ricardo, who has read through the first draft of the manuscript, and favoured him with additional references and localities, as well as a series of notes on doubtful points of synonomy, which have been incorporated in the final manuscript for press.

	S. Ceylon Hills.	N. Ceylon	S. Indian Hills	Malabar Coast	Carnatic	Rajputana.	C. India.	Baluchistan and Seistan	I. G. Plains, West	I. G. Plains, East	W Himalaya	E. Himalaya.	Assam Plains	Assam Hills.	Burma.	Yunnan.	Siam	Malay Peninsula	Malayan Archip	China.
H. roralis Fb.		+		+	+		+			+									+	
H. limbata Big.														+						
H. striatipennis Brun.											+									
H. indiana Big.													+	+						
H. cana Wlk.										+										
H. dissimilis Ric.				+																
H. waizonata Ric.	+																	+	+	
H. beesoni S W															+					
H. annandalei Ric.				+										+						
H. litoralis Ric					+															
H. rhizophorae S W		+																		
H. rubida Ric.															+			+		
H. javana Wd.			+	+						+	+			+	+			+	+	
H. demelloi S.W				+																
H. albofasciata ... Brun.											+									
H. lata Ric.									+					+	+	+			+	
H. assamensis Ric									+					+						
H. marginata Ric										+			+							
H. brevis Ric		+			+															
H. ricardonis S W.	+																			
H. tessellata Ric.		+																		
H. bilineata Ric.				+																
H. cingalensis Ric		+																		

TABLE I—*contd.*

	S. Ceylon Hills.	N. Ceylon.	S. Indian Hills.	Malabar Coast.	Carnatic.	Rajputana.	C. India.	Baluchistan and Seistan.	I. G. Plains, West	I. G. Plains, East	W. Himalaya.	E. Himalaya.	Assam Plains.	Assam Hills.	Burma	Yunnan.	Siam.	Malay Peninsula.	Malayan Archip.	China.
H. latifascia Ris.	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..
H. montana Ris.	..	..	+	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..
H. fusciforns Austen	..	..	..	..	..	..	..	..	..	+	..	..	..	..	+	..	..	..	..	..
H. fasciata Ris.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
H. burmanica S.W.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..
H. inconspicua Ris.	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
H. hindostani Ris.	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
H. immaculata Ris.	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

	S. Ceylon Hills.	N. Ceylon.	S. Indian Hills	Malabar Coast	Carnatic	Rajputana.	C India	Baluchistan and Seistan.	I G. Plains, West.	I. G. Plains, East	W. Himalaya.	E Himalaya	Assam Plains.	Assam Hills.	Burma	Yunnan	Siam.	Malay Peninsula.	Malayan Archip.	China.
T. leleana Aust.	..	..	..	..	..	..	..	+	..	..	+	..	..	..	..	..	..	..	..	..
T. hirtipalpis Ric.	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..
T. eggeri Sch.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
T. glaber Big.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
T. excelsus Ric.	..	..	..	..	..	..	..	..	+	..	+	..	..	..	..	..	..	..	..	..
T. macer Big.	..	..	..	+	+	..	+	..	+	+	+	..	..	..	..	..	..	..	..	..
T. pulvifer Wlk.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
T. pulchellus Lw	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
T. adjacens Ric.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
T. flavocinctus Ric.	..	..	+	?	..	..	..	..	+	..	..	..	..	+	..	..	..	..	+	..
T. leucocnematus Big.	..	..	+	..	..	..	..	..	..	..	..	+	..	+	+	..	..	..	..	..
T. bicinctus Ric.	..	..	+	+	..	..	..	..	+	..	..	..	..	..	..	..	..	+	..	+
T. sexcinctus Ric	..	..	..	..	..	..	..	..	..	..	+	..	..	..	+	..	..	..	..	+
T. ditaeniatus Macq.	..	..	..	+	+	..	..	+	+	+	..	..	..	..	..	..	..	..	..	+
T. sufis Jaenn	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..
T. virgo Wd	..	..	..	..	+	..	..	..	+	+	+	..	..	..	..	..	..	..	..	..
T. nemocallosus Ric.	..	..	..	..	..	..	..	..	+	+	..	..	..	..	..	..	..	..	..	..
T. optatus Wlk.	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	+	+	..
T. melanognathus Big.	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	+	..
T. kakhyenensis S.W.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..
T. nephodes Big.	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	..	..	..	..
T. albofasciatus Ric.	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..
T. auriflamma Wlk.	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	..	..	..	..

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T. formanious Big.														+	+			+		+
T. tenebrosus Wlk.				+																
T. leucohirtus Ric.				+																
T. atrohirtus Ric.	+																		+	
T. flavissimus Ric.	+																			
T. joidus Big.													+							
T. flavoventris Big.	+									+			+		?					
T. diversifrons Ric.										+			+	+						
T. demellonis S.W.				+																
T. subcinerascens Ric.															+					
T. obconicus Wlk.				+			+			+										
T. tuberculatus Ric.					+					+			+							
T. ceylonicus Sch.		+															+	+	+	
T. fasciauda Big.	+														+				+	
T. subhirtus Ric.				+						+									+	
T. subcallosus Ric.										+	+	+			+					
T. hirtus Wlk.											+									
T. wyvillei Ric.											+									
	10	6	8	19	9	..	2	8	12	22	15	9	13	16	19	2	..	..	..	..

KEYS TO SUB-FAMILIES AND TO GENERA, ADAPTED FROM DE SURCOUF.

Hind tibiæ without spines No ocelli, at most a vestigial tubercle . . . . TABANINÆ.
Hind tibiæ always spined. Usually three well-developed ocelli . . . PANGONINÆ

TABANINÆ.

1. Apical portion of third antennal segment of three divisions . . . . . *Hæmatopota* Meig.
   Apical portion of third antennal segment of four divisions 2
2. Third antennal segment simple, no basal tooth or process 3
   Third antennal segment with a basal tooth or process 4
3. Antennæ arising from a frontal tubercle, third segment cylindrical. Palpi thickened basally, bent, apically pointed . . . . *Udenocera* Ric.
   Antennæ not arising from a frontal tubercle, third segment conical. Palpi elongate, subulate . . . . *Diachlorus* O. S.
4. Antennæ not arising from a prominent tubercle. Frontal calli usually present *Tabanus* Linn.
   Antennæ arising from a prominent tubercle. No frontal calli . . . . *Neotabanus* Ric.

PANGONINÆ.

1. Third antennal segment of 8 divisions. Proboscis greatly prolonged . . . *Corizoneura* Rond.
   Third antennal segment of 5 divisions. Proboscis normal 2
2. Third antennal segment with a basal tooth or process . . . . . *Gastroxides* Saund.
   Third antennal segment simple . . . 3
3. First and second antennal segments long, subequal . . . . . *Chrysops* Meig.

First antennal segment long, second short . . . .

4. Tibiae normal . . . . .

Tibiae large and flattened. Whole aspect of insect bee-like . . . .

TABANIDÆ.

Howlett, Ind. Ins. Life, 592-595, tab. lxii, [general acct]; *id.*, *loc. cit.*, tab lxii, 1-1o, [life history of unnamed sp.]; Lefroy, Pusa Bull. 7, (1907), 15-34, [preliminary acct., biting flies of India]; Hine, U. S. Dept. Agric. Bull., Tech. ser. 12, pt. 11, (1906), [habits and bionomics, N. Amer. spp.]; King, 4th. Rept. Wellcome Lab., (B), 114-125, tab., [life histories of some Tabanid larvæ]; Hill, Bull Entom. Res., xii, 41-62, tabs. and t. figs., [bionomics of some Australian spp.]; Hine, Bull. U. S. Dept. Agric., xliv, 57-60, xlvi, 23-25, (1904), [bionomics of N. Amer. spp.]; March. Rockefeller Inst. Monog., xiii, [early stages, abst. in Rev. App. Ent., (B), ix, 122], Jones, Entomologist, lv, 40-42, [habits of ♂♂, British]; Patton, Ind. Jo. Med. Res., vii, 735-750, tab. lxvii and t. fig., [Mesopotamian spp.], Gaiger, Jo. Trop Vet. Sci., v, 65-71, [check list of parasites of Indian domestic animals]; Shiraki, Taihoku Expt. Stn. Bull., (1918), [acct. of Formosan spp.]; McFie, Bull. Entom. Res., iii, 223-224, [attracted by scale insects, sweeping movements of tarsi]; Neave, *loc. cit.*, iii, 281, [if ♂♂ numerous, ♀♀ not biting]; Patt. and Cragg, T. B. Med. Ent., 271-276, [general acct.], 294-305, [bionomics and lab. breeding]; Surc., Gen. Ins. Fasc. 175, 17, [copulation], 22, [bionomics], 183-

194, [do.]; Isaac., Ind. Agric. Ent. Mem. viii, 53, [method of rearing], 57, [number of moults].

Anatomy. Patt and Cragg, T. B. Med. Ent, 22-28, tab. iv, 4, tab. v, 1-4, [mouth parts], 35, [Prestomum], tab. xiv, 3-4, [ovipositor]. 69-74, [thorax], tab. xv, 3, [tarsus], tab. xx, 2-3, p. 98, [thorax and respiratory system], 102-108, tab. xxi, 1, 2, 5, 6, [alimentary tract], 124-5, tab. xxvi. [digestion], tab. xxvii. 1, [nervous system], tab. xxviii, 1, [genital organs], 421, [dissection]; Lloyd, Bull. Ent. Res., iii, 96, [dissection of salivary glands]; Vogel, Zool. Jahrb., xlii (2), 259-282, tab. x, [mouth parts]; Cragg, Ind. Jo. Med Res. vii, 648-663, tabs. lxi, lxii, lxiii, t fig.. [secretion and epithelial regeneration in mid gut], Surc. Gen. Ins. Fasc. 175, 1-2, tab. i, 1-3. [head], 3, [mouth parts], 6, [thorax], 7, [wing], 11 tab. i 4-5, [legs], 11, [abdomen], 12, tab. i, 6b-f, 7a-b, 8a-b, 9, 10, 11a-b, 12a-b, 13a-b, [♂ genitalia], 15, tab. i. 14-15, [♀ genitalia], 19, [larva], 21, [pupa], Graber, Arch. f. mik. Anat , xvi, (1879), [Graber's organ]

Classification and Distribution. Surc. Gen. Ins. Fasc 175. 23, [classification], 201-204, [distribution]; Aust., Bull Ent. Res, xii. 431-455, [Siamese]; Pratt, Jo. Trop Vet. Sci, iv, 390-1, [principal F M. S. spp]; Villen., Ann. Soc., Ent. Fr., (1905), 306-310, [Meigen's types at Paris]; Ric, R. I. M, iv, 111-258, tab. xiii, 321-399, tabs xv-xviii, [revision of Oriental spp].

Enemies. d'Abreu, Proc. iiird. Ent. Meetg. Pusa, iii, 866, [birds]; Shiraki, Tai-

boku Expt. Sta. Bull., (1918), 5, [American and Australian *Phonurus* spp.], Bull. Ent. Res., i, 156-7, *loc. cit.*, ii, 182, [*Bembex* spp.] ; Patel, Pusa Sci. Repts., (1919-20), 96, [Indian egg parasites], Fletcher, *loc. cit.*, (1920-21), 47-48, [do.] ; Surc., Gen. Ins. Fasc. 175, 22-23, [general notes] ; Port., Petrograd, 1899, (Rossicé), (Summary in Zool. Centralbl., vii, 807, (1900), [methods of destruction].

Disease Transmission. Peace, Jo. Trop. Vet. Sci., i, 70, 91, [2 African spp. carrying Surra] ; Lingard, *loc. cit.* i, 92-112, [carrying over of *Tryp. evansi* from season to season] ; Holmes, *loc. cit.*, i, 119, [biting flies in Trypanosomiasis], Sergent, Ed & Et., *loc. cit.*, i, 214-241, (abs. from Ann. Inst. Pasteur, [el Debab] ; Birt, Jo. R. A. M. C., vi, 653-58, (abs. Jo. Trop. Vet. Sci., i, 449-451), [Herpetomonads of 2 European spp.] ; Laveran & Mesnil, Ann. Inst Pasteur, xx, 296-303, (abs. Jo. Trop. Vet. Sci., i, 467), [trypanosomiasis of horses in Annam compared with Surra, Tabanidæ carry] ; Holmes Jo. Trop. Vet. Sci., iii, 157-172, tabs. xiv, xv, [investigation of surra outbreak, acct. of Naini Tal road] ; Marra, Rev. Gen. Méd. Vét. xi, 49-57, (abs. Jo. Trop. Vet. Sci., iii, 409, [spreading epizootic aphtha] ; Leese, Jo. Trop. Vet. Sci., iv, 107-132, [expts. on natural trans. of surra] ; Fraser Symonds & Pratt, Pub. ix, F. M. S. Inst. Med. Res., (abs. Ind. Med. Gaz., xliii, (11), 427-8, Jo. Trop. Vet. Sci., iv, 203-4 ; reprinted, *loc. cit.*, iv, 345-389), [surra in F. M. S., 4 spp. of Tabanidæ carry] ; Old, Jo. Trop. Med.

Hyg., xii, (2), (1909) (reprinted. Jo. Trop. Vet. Sci., iv, 395-416, [Trypanosomiasis], Baldrey, Jo. Trop. Vet. Sci., vi, 271-282, tabs. xiii, xiv, [developmental cycle of surra in Tabanidæ]; Leese, *loc. cit.*, vii, 19-32, (abs Trop. Vet. Bull., i, 15-17), [biting flies and surra], Patton, Ind. Jo. Med. Res., vii, 735-750, [summary of knowledge to 1920 on Tabanidæ and trypanosomiasis]; *id.*, Arch. f. Protist., xv, 333-362, tab. xxx, and t. figs., [*Crithidia tabani*]; Fletcher & S. White, Proc. ivth. Ent. Meetg. Pusa, 222-235, tab. xl, [review of knowledge of vectors of surra]; Cross & Patel, Punjab Vet. Bull., (6), 1921, (abs. Rev. Appl. Ent., (B), x, 63, [surra, ticks carry, Tabanidæ only vectors]; Sergent, C. R. Soc. Biol. Paris, lxxxv, 408, (abs Rev. App. Ent. (B), ix, 181, [Tabanidæ transmit Sarcocystis].

TABANINÆ.

Shiraki, Taihoku Expt. Stn. Bull. (1918), 87-88; Surc, Gen. Ins. Fasc. 175, 25, [key to genera of World].

KEY TO THE KNOWN INDIAN SPECIES OF *HÆMATOPOTA*. BASED ON RICARDO'S GROUPING.

[Generally applicable to ♀♀ only].

1. Legs uniform in colour . . . . Group I.
   Legs not uniform in colour . . 2
2. Tibiæ without pale rings, but base of front pair, at least, pale . . Group II.
   At least mid tibiæ with median and subapical pale rings 3

Group IV.

1. Apical band of wing double . . .	2
Apical band of wing single . . .	*annandalei* Ric.
2. Abdomen with lateral grey spots . .	*litoralis* Ric.
Abdomen with only hind margins of segments greyish	*rhizophoræ* S. W.

Group V.

1. Wing with a pale, oblique transverse streak only	*rubida* Ric.
Wing with the usual rosette markings .	2
2. Apical band of wing double . . .	3
Apical band of wing single . . .	4
3. Hind tibiæ strongly fringed . . .	*javana* Wd.
Hind tibiæ not strongly fringed . .	*demeilloni* S. W.
4. Apical band very broad, other pale markings very narrow	*albofasciatipennis* Brun.
All pale markings of wing approximately equal in breadth, as usual . .	5
5. First antennal segment incrassate, as long as first division of third segment	*lata* Ric.
First antennal segment narrower, not as long as first division of third segment	*assamensis* Ric.

Group VI.

1. Apical band of wing double . . .	2
Apical band of wing single . . .	7
2. Apical bands very broad, almost filling up apex of wing	*marginata* Ric.
Apical bands not almost filling up apex of wing	3
3. Both branches of apical band joined at their base, then diverging . . .	4
Branches of apical band separate, commencing on opposite borders of wing, and usually overlapping in the middle	6
4. First segment of antenna shorter than basal annulation of third . . .	5
First segment of antenna longer than basal annulation of third . . .	*tesselata* Ric.

5. Frontal callus yellow-brown, paired spots touching it . . . . . . [illegible] Ric.
   Frontal callus shining black-brown, paired spots well separated . . . [illegible] W.
6. First antennal segment incrassate, as long as first division of third segment . [illegible] Ric.
   First antennal segment narrower, but nearly as long as whole third segment . cingalensis Ric.
7. Apical band very broad, reaching from outer to inner border of wing . . 8
   Apical band of wing narrower . . 9
8. A broad black band on face . . [illegible] Ric.
   No broad black facial band . . [illegible] Ric.
9. Apical band reaching from outer to inner border of wing 10
   Apical band not reaching from outer to inner border 11
10. Frons very narrow. A large cordiform dark spot in place of usual paired spots . . . . . . fusifrons Aust.
    Usual paired spots present on frons . [illegible] Ric.
11. Hind femora and apical two thirds of hind tibiæ black fringed . . . burmanica S. W.
    Hind legs without noticeable fringes . 12
12. First antennal segment more than half as long as third 13
    First antennal segment shorter than this inconspicua Ric
13. A black band on upper part of face . hindostani Ric.
    No black facial band, but usually a spot on each side below . . . . immaculata Ric.

1. Hæmatopota, Meigen.

Hæmatopota, Meig., Illig. Mag., ii, 267, 40, (1803), Wulp, Cat. Dipt. S. Asia, 66; Howlett, Ind. Ins. Life, tab. lxii, 5, [unnamed sp. figd.]; Ric., A. M. N. H. (7) xviii, 113; *id.*, R. I. M., iv, 321, [papers on Oriental spp. with keys]; Shiraki, Taihoku Expt. Stn. Bull. (1918), 88-92, [Formosan spp.]; Patt. & Cragg, T. B. Med. Ent., 291,

292, 295, [feeding point], 297, [oviposition] ; Cragg, Sci. Mem. M. O. Ind., lv, [structure of *H. pluvialis*].

Chrysozona, Meig., Nouv Class., 23, 34, (1800) ; Kert , Cat. Dipt., iii, 201 ; Verrall, " British Flies", v, 772, [reasons against adoption of name] ; Aust., African Blood-Sucking Flies, 121, [do.] , Surc., Gen. Ins. Fasc. 175, 29, [key to sub-genera], 31, [sub-genera defined].

Austenia, Surc., Bull Mus H. N. Paris, 455, (1909) ; *id.*, Gen Ins Fasc 175, 29, [sub-genus].

Parhæmatopota, Grunb., Zool Anz , xxx, 360, (1906) ; Surc , Gen. Ins. Fasc. 175, 36, [sub-genus].

Potisa, Surc., Bull. Mus. H N. Paris, 455, (1909) ; *id* & Gonz., Dipt Vuln. Venezuela, ii, 29 ; *id* , Gen Ins Fasc. 175, 30, [sub-genus].

albofasciatipennis, Brunetti.

Hæmatopota albofasciatipennis, Brun , R. I M , vii, 458-60, tab. xxxvii, 1,[1] (1912).	Bhowali (Kumaon)[1]
Chrysozona albofasciatipennis, Surc. Gen. Ins. Fasc 175, 32.	

annandalei, Ricardo.

Hæmatopota annandalei, Ric., R I. M , iv, 335-6, tab. xvii, 21,[1] (1911) ; Brun , *loc. cit.*, xxvi, 100, [♂ descr.]	Shillong[1] Umling (Assam)[1]
Chrysozona annandalei, Surc , Gen. Ins Fasc 175, 32.	[Baroma (Assam) Igatpuri (Bombay)]*

assamensis, Ricardo.

Hæmatopota assamensis, Ric., R. I. M., iv, 343-4, tab xvii, 29, (1911)[1]	Nongpoh (Khasia)[1] Shillong[1]
Chrysozona assamensis, Surc , Gen. Ins. Fasc. 175, 32.	[Dogaon]

* Records of localities enclosed within square brackets have been added from material in the Pusa collection.—T B. F.

beesoni, Senior White.

Hæmatopota beesoni, S. W., Mem. Dept. Agric. Ind., vii, 145, tab. xi, 4, 5 (1922), 107, [note][1].	Bendaung (Burma).[1]

bilineata, Ricardo.

Hæmatopota bilineata, Ric., R. I. M., iv, 350-1, tab. xviii, 34, (1911)[1].	Igatpuri (W. Ghats)[1]
Chrysozona bilineata, Surc., Gen. Ins. Fasc. 175, 32.	

brevis, Ricardo.

Hæmatopota brevis, Ric., A. M. N. H., (7) xviii, 122-3, tab. vi, 19,[1] (1906); id., R. I. M., iv, 349-50, tab. xvi, 16[2].	Trinco Dis. (Ceylon)[1, 2] Bangalore[1, 2] Punjab Madras Pres. (B. M. Colls.)

burmanica, Senior White.

Hæmatopota burmanica, S. W., Mem. Dept. Agric. Ind., vii, 147, tab. xi, 6, 7,[1] (1922); 107, [note].	Bendaung (Burma)[1]

cana, Walker.

Hæmatopota cana, Wlk., List Dipt. B. M., i, 207,[1] (1848); Big., Bull. Soc. Zool. Fr., xvi, 79[2]; id. T. A. S. B., lx, 264[3]; Wulp, Cat. Dipt. S. Asia, 66[4]; Ric., A. M. N. H., (7) xviii, 116-17[5]; id. R. I. M., iv, 330[6], [redescribed].	[1, 2, 3, 4, 5, 6, 7, 8] N. Bengal. (Probably from Terai). The collector, Dr. Campbell, was here stationed (vide Hooker's 'Himalayan Journals')
Chrysozona cana, Kert., Cat. Dipt., iii, 202[7]. Surc., Gen. Ins. Fasc. 175, 32[8].	Poona (B. M. Colls.)

cingalensis, Ricardo.

Hæmatopota cingalensis, Ric., A. M. N. H., (7) xviii, 119, tab. v, 16[1], (1906); id., R. I. M., iv, 351-2, tab. xvi, 15[2]; Henry, Trop. Agric., xlvii, 160[3].	Trinco Dis. (Ceylon)[1, 2] Anuradhapura (Ceylon)[1, 2]
Chrysozona cingalensis, Surc., Gen., Ins. Fasc. 175, 32.	Haberane (N. C. P. Ceylon)[3] Matale (Ceylon)[3]

demellonis, Senior White.

Hæmatopota demellonis, S. W., Mem. Dept. Agric. Ind., vii, 146, tab. xi, 1-3[1], (1922).	Goa (Port. Ind.)[1]

dissimilis, Ricardo

Hæmatopota dissimilis, Ric., R. I. M., iv, 331-2, tab. xvii, 22[1], (1911). — N Kanara[1]

Chrysozona dissimilis, Surc., Gen. Ins. Fasc 175, 33.

fasciata, Ricardo.

Hæmatopota fasciata, Ric., R. I. M., iv, 358[1], (1911). — Shillong[1]; Darjiling District (B. M. Colln.)

Chrysozona fasciata. Surc. Gen. Ins. Fasc. 175, 33.

fuscifrons, Austen.

Hæmatopota cordigera. Big., Bull. Soc Zool. Fr., xvi, 76[1], (1891); *id* Mem. Soc. Zool. Fr., v, 626[2], Wulp, Cat. Dipt. S Asia, 67[3]; Ric., A. M. N. H., (7) xviii, 125, tab. vi, 21[4] — Bengal[1, 2, 3, 4, 5]; Bondaung (Burma)[1]; Mohnyin (Burma)[6]

Chrysozona cordigera. Kert., Cat. Dipt., iii, 202, Surc., Gen. Ins. Fasc. 175, 33.

Hæmatopota fuscifrons, Aust., A. M. N. H., (8) i, 411, (1908), [renamed]; Ric., R. I. M., iv, 357-8, tab. xvii, 17[5]; S. W., Mem. Dept. Agric. Ind., vii, 107[6].

[Preoccupied by another *H. cordigera*, Bigot, from Abyssinia].

hindostani, Ricardo.

Hæmatopota hindostani, Ric., A. M. N. H., (8) xix, 226[1], (1917). — Bababuddin Hills (Mysore)[1]; [Dodabetta (Nilgiris)]

Chrysozona hindostanti, (*laps.*), Surc. Gen. Ins. Fasc. 175. 33.

immaculata, Ricardo.

Hæmatopota immaculata, Ric., R. I. M., iv, 359-60, tab. xviii, 33[1], (1911). — Kanara (Bombay)[1]; Bombay[1]

Chrysozona immaculata, Surc., Gen. Ins. Fasc. 175, 33.

inconspicua, Ricardo.

Hæmatopota inconspicua, Ric., R. I. M., iv, 358-9, tab. xviii, 31[1], (1911). — Igatpuri (W. Ghats)[1]

Chrysozona inconspicua, Surc., Gen. Ins. Fasc. 175, 33.

indiana, Bigot

Hæmatopota indiana, Big., Bull. Soc. Zool. Fr., xvi, 78[1], (1891); *id.*, Mem. Soc. Zool. Fr., v, [illegible]; Wulp, Cat. Dipt. S. Asia, 67; Ric., A. M. N. H., (7) xviii, 124, tab. vi, 20; *id.*, R. I. M., iv, 328-9, tab. xvii, 19[2], [redescribed]. — Margherita (Assam)[1, 3] Tezpore (Assam)[3] [[illegible]]

Chrysozona indiana, Kert., Cat. Dipt., iii, 203; Surc., Gen. Ins. Fasc. 175, 33.

javana, Wiedemann.

Hæmatopota javana Wd., Dipt. Exot., 100, (1821); *id.*, Aus. Zweifl. Ins. i, 218[1]; Wulp., Dipt. Sumat. Exp., 33, tab. i, 12[2]; *id.*, Cat. Dipt. S. Asia, 66[3]; Wlk., List Dipt. B. M., i, 208; *id.*, loc. cit., Suppl. i, 297, 13; Big. Bull. Soc. Zool. Fr., xvi, 77; Huxley, Ind. Ins. Life, tab. lxii, 5; Ric., R. I. M., iv, 340-3, tab. xvii, 25[4]; Fletcher, Pusa Sci. Repts., 1920-21, 46, tab. iii, [bionomics, early stages]. S. W., Mem. Dept. Agric. Ind., vii, 107[5]. — Pusa[4] Calcutta[4] Bengal (generally)[4] Lushai Hills[4] Bachar (Bihar)[4] Pyinmana (Burma)[4] [illegible] (Burma)[4] [Coimbatore (S. India) Bihar (generally) Murree hills (Punjab) Manikganj (Bengal) [illegible] Nowgong (Assam) Khasi hills (Assam) Kathgodam (United Provinces) Kallar (Nilgiris, S. India)]

Chrysozona javana, Kert., Cat. Dipt., iii, 204; Surc., Gen. Ins. Fasc. 175, 34.

? *Hæmatopota asiatica*, Rond., Ann. Mus. Civ. Genoa, vii, 461, (1875), [*hyps.*]; Kert., Cat. Dipt., iii, 204. — Java[1, 2, 5] Sumatra[2, 3] Borneo[3]

? *Hæmatopota nigra*, Wd., Dipt. Exot., 101, 7[6], (1821); Kert., Cat. Dipt., *l.c.*, 204-5. — F. M. S.[4]

lata, Ricardo.

Hæmatopota lata, Ric., A. M. N. H., (7) xviii, 121-2[1], (1906); *id.*, R. I. M., iv, 344-5, tab. xvii, 26[2]; *id.*, loc. cit., iv, 401[3]; Edw., Jo. F. M. S. Mus., viii, 27[4], [?]; C. Vet. Dept. Mem., ii, tab. v, B, [?]; Fletcher and S. W., Proc. ivth. Ent. Meetg., Pusa, 226[5]. — Khasia Hills[1, 2] N. Chin Hills[1, 2] Yunnan[3] Mohand (U. P.)[5]

Sumatra, montane[4]

Chrysozona lata, Surc., Gen. Ins. Fasc. 175, 34.

latifascia, Ricardo.

Hæmatopota latifascia, Ric., R. I. M., iv, 356, tab. xvi, 10[1], (1911). — Shillong[1]

Chrysozona latifascia, Surc., Gen. Ins. Fasc. 175, 34.

limbata, Bigot

Hæmatopota limbata, Big., Bull. Soc. Zool. Fr., xvi, 78[1], (1891); *id.*, Mem. Soc. Zool. Fr., v, 626[2]; Wulp, Cat. Dipt. S. Asia, 66[3], Ric., A. M. N. H., (7) xviii, 115[4], *id.*, R. I. M., iv, 325-6[5], [redescribed]. — Shillong[1, 2, 3, 4, 5] Khasia Hills[4, 5]

Chrysozona limbata, Kert., Cat. Dipt., iii, 205, Surc., Gen. Ins. Fasc. 175, 34.

litoralis, Ricardo

Hæmatopota litoralis, Ric., A. M. N. H., (8), xi, 546[1], (1913) — Puri (E. Coast)[1]

Chrysozona litoralis, Surc., Gen. Ins. Fasc. 175, 34.

marginata, Ricardo.

Hæmatopota marginata, Ric., R. I. M., iv, 347-8, tab. xviii, 32[1], (1911) — Pusa[1] Goalbathan (E. Bengal)[1] Tezpore (Assam)[1] Bihar (B. M. Col.) [Saran (Bihar)]

Chrysozona marginata, Surc., Gen. Ins. Fasc. 175, 34.

montana, Ricardo

Hæmatopota montanus, Ric., A. M. N. H., (8) xix, 225[1], (1917) — Bababuddin Hills[1] Coonoor[2]

Hæmatopota montana, Patton, Ind. J. Med. Res., x, 67[2]. — Mahableshwar (B. M. Col.)

Chrysozona montana, Surc., Gen. Ins. Fasc. 175, 34. — [Santikoppa, Sidapur and Pol. betta (Coorg) Shillong, (Assam)]

rhizophoræ, Senior White.

Hæmatopota rhizophoræ, S. W., Spol. Zeyl., xi, 387, tab. i, 1, (1921). — Trincomali (Ceylon)[1]

ricardonis, Senior White

Hæmatopota ricardonis, S. W., Spol. Zeyl., xiii, 209, tab. vii, 1-3[1], (1925). — Ratnapura (Ceylon)[1]

roralis, Fabricius.

Hæmatopota roralis, Fb., Syst. Antl., 107, 2[1] (1805); Wd., Dipt. Exot., 97 [illegible] 1[2]; *id.*, Auss. Zweifl. Ins., i, 215[3]; Big., Bull. Soc. Zool. Fr., xvi, 7[illegible]; *id.*, T. A. S. B., lx, 261[4]; Wlk., List Dipt. B. M., i, 208; Wulp, Cat. Dipt. S. Asia, 66[5]; Ric., A. M. N. H., (7) xviii, 116; *id.*, R. I. M., iv, 325-6, tab. xvii, 24[6], [redescribed].

Chrysozona roralis, Kert., Cat. Dipt., [illegible] 208, Surc., Gen. Ins. Fasc. 175, [illegible]

[illegible] Tranquebar ([illegible])
Trinco District (Ceylon)[illegible]
Calcutta[illegible]
Goalundo (E. Bengal)
Gorakhpur (U. P.)[illegible]
Bahar[illegible]
([illegible] Madras Pres.)
Nagpur
Bhandara (C. P.)
Surat (Bombay)
Balugaon (Orissa)
Bihar (generally)
[illegible] (Ceylon) S. W.

Java[illegible]
Borneo[illegible]

rubida, Ricardo.

Hæmatopota rubida, Ric., A. M. N. H., (7) xviii, 120, tab. vi, 10[1], (1906); *id.*, R. I. M., iv, 338, tab. xvi, 18[2], Pratt, Jo. Trop. Vet. Sci., 396-4[3], [F. M. S. distribution].

Potisa rubida, Surc., Gen. Ins. Fasc. 175, 31.

Burma[1, 2]
[illegible]
F. M. S.[3]

striatipennis, Brunetti.

Hæmatopota striatipennis, Brun., R. I. M., vii, 460-1, tab. xxxvii, 2[2], (1912); S. W., Mem. Dept. Agric. Ind., vii, 107[3].

Chrysozona striatipennis, Surc., Gen. Ins. Fasc. 175, 35.

Dehra Dun[1, 2]

tessellata, Ricardo.

Hæmatopota tessellata, Ric., A. M. N. H., (7) xviii, 120, tab. v, 7[1], (1906); *id.*, R. I. M., iv, 348-9, tab. xvi, 14[2].

Chrysozona tessellata, Surc., Gen. Ins. Fasc. 175, 35.

[1, 2] Trinco District (Ceylon)

unizonata, Ricardo.

Hæmatopota unizonata, Ric., A. M. N. H., (7) xviii, 118, tab v, 15, 15A[1], (1906); *id.*, R. I. M., iv, 332-3, tab. xvi, 12, 13[2]; Pratt, Jo. Trop. Vet. Sci, iv, 390-4[3], [F M S. distribution]; Longstaff, 'Butterfly Hunting,' 384[4]; Edw., Jo. F. M. S. Mus, vii, 27[5], [?]	Hakgala[1, 2] Newera Eliya[2] Pundaluoya[2] Hatton[4] Galagedera [all Ceylon Hills]
Chrysozona unizonata, Surc., Gen. Ins. Fasc 175, 36.	F. M. S.[3] Sumatra (mountains)[3]

2. Udenocera. Ricardo.

Udenocera, Ric., A. M. N. H., (7) xiv, 352, (1904), Kert., Cat Dipt., iii, 210; Ric, R. I. M., 361-2, Surc, Gen Ins Fasc 175, 48

brunnea, Ricardo.

Udenocera brunnea, Ric., A. M. N. H., (7), xiv, 355[1], (1904); *id*, R. I. M, iv, 362-3, tab xvi, 8[2], Kert, Cat Dipt, iii, 210; Surc., Gen Ins Fasc 175, 49, [description requoted], tab ii, 12a	Kandy (Ceylon)[1, 2]
? *Chrysops parallelus,* Wlk, Proc Linn Soc., Lond., v. 276[3], (1861)	Batjan Ids [3, 4]
? *Diachlorus parallelus,* Ric, A M N H, (7) ix, 372[4].	

3. Diachlorus, Osten-Sacken.

Diachlorus, O-S, Mem. Boston N. H. S., ii, 475, (1876), Kert., Cat. Dipt., iii, 211; Surc., Gen. Ins Fasc 175, 49.
Diabasis, Macq., Suit à Buff, i, 207, (1834), [*nec* Hoffmsg, 1819].

fulvescens, Brunetti.

Diachlorus fulvescens, Brun., R. I. M., vii, 456-8[1], (1912); Surc., Gen. Ins Fasc., 175, 51, [wrong date quoted].	Dha Kuri (Kumaon)[1]

KEY TO THE KNOWN INDIAN SPECIES OF *TABANUS*

[Adapted from Ricardo. Generally applicable to females only.]

1. Eyes bare	2
Eyes hairy (sub-genus *Therioplectes*) .	Group XI
2. Frons with varying arrangement of calli	3
Frons with no calli	Group IV
3. Frons with two separate calli .	4
Frons with one square, narrow or oblong callus, which is always prolonged towards the vertex by a more or less narrow line . . .	6
4. First callus usually transverse, second irregular in shape smaller. Frons 3-6 times as long as broad. Small spp., 9-14 mm. long	5
Both calli small, round, spot like, one above the other	Group III
5. Thorax and scutellum concolorous. Abdomen unbanded	Group I
Scutellum pale haired. Abdomen with pale bands	Group II
6. Wings with spots or bands . . .	Group V
Wings distinctly dark marked, but not banded. Large spp. 18-23 mm. long .	Group VI
Wings not noticeably marked . .	7
7. Abdomen with stripes and or bands .	8
Abdomen without stripes or bands .	Group X
8. Species with one or more usually continuous stripes on abdomen .	Group VII
Species with median and or lateral spots on abdomen, not usually forming a continuous stripe	Group VIII
Species with pale bands and sometimes spots on abdomen	Group IX

Group I.

1. Femora black or grey	2
Femora yellow	6
2. Femora black, front tibiæ pale in whole or part	3
Femora grey, front tibiæ black . .	*leleani* Aust.

3. Thorax and abdomen shining black, latter with narrow red segmentations . . *hirtipalpis* Ric.
   Thorax with grey tomentum, usually more or less forming stripes . . 4
4 Frons 7-8 times as long as wide 1st posterior cell, (in ♀ only) narrowed or closed . . . . *eggeri* Schin.
   Frons broader, 5 times as long as wide. 1st posterior cell normal . . . 5
5. Antennæ black . . . . . . *glaber* Big
   Antennæ reddish . . . . . *excelsus* Ric.
6. Abdomen black, with three grey stripes . *macer* Big.
   Abdomen mainly black, unstriped, some reddish laterally . . 7
7. Abdomen black, frons less than 3 times as long as wide . . . . . . *pulverifer* Wlk.
   Antennæ yellow. Frons 3½-4½ times as long as wide 8
8. Four round black dots on fore border of all abdominal segments except last . *pulchellus* Lw.
   Abdomen with black median stripe, extended to sides along hind margins, and occupying nearly all of last 3 segments dorsally . . . . . *adjacens* Ric.

Group II.

1 Brown species, scutellum and abdominal bands yellow-haired . . . 2
   Black species, scutellum and abdominal bands white-haired 3
2. Abdomen with 6 narrow bands. Front tibiæ pale on basal two-thirds only . *flavicinctus* Ric.
   Abdomen with 2 broad bands. Front tibiæ with only extreme tips black . *leucocnematus* Big.
3. Abdomen with 2 bands. Front tibiæ pale on basal two-thirds only . . *bicinctus* Ric.
   Abdomen with 6 bands Front tibiæ with only extreme tips black . . *sexcinctus* Ric.

Group III.

1. Abdomen yellowish, with median and lateral brown or black stripes . . *ditæniatus* Macq.

Abdomen blackish grey with 3 series pale spots . . . . *sufis* Jaenn.

Group IV

1. Abdomen brown, reddish basally, covered with grey tomentum, with two small greyish spots on each segment. Wings with no appendix. 7-11 mm. . *virgo* Wlk.
   Abdomen blackish brown, with median and lateral grey tomentose spots Wings with an appendix. Long 13 mm. . . . . *nemocallosus* Ric.

Group V.

1. First posterior cell open . . . 2
   First posterior cell closed . . . . *kakhyeniensis* S. W.
2. Frons narrowest at vertex Abdomen reddish, with small white median spots . . . . *optatus* Wlk.
   Frons narrowest anteriorly. Abdomen yellowish, with larger white median spots . . . . *melanognathus* Big.

Group VI.

1. First posterior cell closed or greatly narrowed apically 2
   First posterior cell open as usual . . *auriflamma* Wlk.
2. Abdomen reddish brown, with grey tomentose bands and median spots. First posterior cell closed Palpi slender . . . . *nephodes* Big.
   Abdomen brown, with grey tomentose bands but no median spots. First posterior cell narrowed in the margin. Palpi large, broad . . . . *albofasciatus* Ric.

Group VII.

1. Frontal callus oblong or narrow with linear extension. Frons at least 5 times as long as broad 2

Character	Leads to
Frontal callus large, somewhat protuberant, quadrate, with short linear extension. Frons 3-4 times as long as broad	12
Abdomen with lateral stripes and spots in addition to the median stripe .	3
Abdomen with no lateral spots, or only isolated ones on second segment .	8
Frontal callus with a spindle shaped linear extension	4
Frontal callus with a narrower linear extension	5
Grey abdominal median and lateral stripes all of same length . . .	*tenens* Wlk.
Median stripe beginning only on 3rd segment, lateral stripes ending on 3rd or 4th segment	*striatus* Fb.
Lateral spots large and distinct . .	6
Lateral spots small and indistinct. Thorax blackish. Abdomen reddish yellow	*conicus* Big.
Lateral spots small but distinct. Forehead narrower anteriorly than in above species	*indiscriminatus* Ric.
Median stripe composed of spots of equal size, not very large	7
Median stripe composed of unequal sized spots, those on 3rd and 4th segments very large and conspicuous. Femora blackish	*speciosus* Ric.
Thorax and abdomen lilac or blackish brown. Femora blackish	*rubidus* Wd.
Thorax, abdomen and femora reddish brown	* *priscus* Wlk.
Median stripe grey tomentose, or white or yellow haired	9
Median abdominal stripe golden haired .	11
Median abdominal stripe black, with a narrow grey stripe often apparent on it	*abscondens* Wlk.

* Recently sunk by Austen in *rubidus* Wd.

9. Frons barely half as wide anteriorly as at vertex. Small brown species . . . [illegible]
   Frons parallel-sided or nearly so . . . 10
10. Large black or reddish brown species, median abdominal stripe narrow. Femora black. Wings tinged brown . . . [illegible]
   Brown species, median abdominal stripe broad, and with 2 round spots on 2nd segment. Femora reddish. Wings brown on fore border . . . [illegible]
11. Frons parallel sided. Abdomen yellowish brown, median stripe dull, indistinct . . . [illegible]
   Frons narrowed anteriorly. Abdomen yellowish-brown, median stripe broad. Front femora yellowish. Wings brown, especially on fore border . . . *hybridus* Wlk.
12. Small black species. Median abdominal grey stripe beginning on third segment, lateral stripes ending on second segment . . . *jucundus* Wlk
   Small brown species. Abdomen with complete median grey stripe . . . *puteus* Ric.

Group VIII.

1. Frons narrow, 6-10 times as long as wide anteriorly, with long, narrow frontal callus . . . 2
   Frons broader, 4-5 times as long as wide, with large, square or pyriform callus . . . 5
2. Brown, reddish or yellowish, median sized or large species, median abdominal spots triangular, greyish or yellowish . . . 3
   Reddish species with black spots on 2nd and 3rd abdominal segments . . . 4
3. Abdomen reddish yellow with small median white spots . . . *rubicundus* Mac
   Abdomen reddish brown, with long triangular median white spots, usually joining one another . . . *indianus* Ric.

Tibiæ and tarsi blackish . . . . *fuscomaculatus* Ric.
Tibiæ and tarsi reddish . . . . *fuscomaculatus* var. *alte-maculatus* Ric.

Frontal callus square. Small black species with white-haired median abdominal spots. Legs blackish. Tibiæ yellowish . . . *leucopogon* Big.
Frontal callus pyriform. Large reddish brown species with median grey triangular abdominal spots. Legs reddish-brown . . . . *discrepans* Ric.

Group IX.

Abdomen blackish-brown, the first 2 segments covered with grey tomentum . *rufiventris* Fb. (♂)
Abdomen of usual pattern and appearance 2
Frons narrow, 7-8 times as long as broad. Frontal callus narrow, with a linear extension 3
Frons broader, 4-5 times as long as broad. Frontal callus large, with a stout, broad or spindle-shaped extension . 8
Large species, abdomen with very narrow pale bands 4
[Smaller species, abdomen with whitish bands 6
Brown species, scutellum and sides of thorax with pale tomentum . . *albocostatus* Big.
Black species, no such pale tomentum . 5
Abdomen fulvous segmented . . *explicatus* Wlk.
Abdomen not fulvous segmented . . *manipurensis* Ric.
Frons narrower anteriorly . . . 7
Frons parallel sided Frontal callus narrow, not reaching eyes. Antennæ, palpi and legs black. Wings faintly brownish . . . . . . *khasiensis* Ric.
Larger species Antennæ, palpi and legs wholly black . . *nicobarensis* Schin.
Smaller species. Antennæ black, palpi grey. Basal half of front and basal 4-5ths of posterior tibiæ yellowish . *angustilimbatus* S. W.

7. Frons narrowest anteriorly. Small reddish-brown species . . . . *trinominata* S. W.
   Frons parallel sided, or nearly so . . 8
8. Reddish-brown species. Frontal callus always distinct 9
   Yellow species. Frontal callus often indistinct . . . . . . *flaviventris* Big.
9. Thorax and scutellum blackish. Antennæ black at tip 10
   Thorax and scutellum reddish. Antennæ not black at tip 11
10 Femora black. Wings slightly tinged brown . . . . *diversifrons* Ric.
   Femora yellowish Wings grey, with hyaline streaks in cells . . . . *demellonis* S. W.
11. Abdomen reddish-brown, unicolorous. Legs reddish-yellow, femora often darker . . . . *subcinerascens* Ric.
   Abdomen with indistinct zig-zag bands of grey tomentum. Legs blackish, femora yellowish . . . . . *obconicus* Wlk
12 Sub-callus bare, shining and tuberculous 13
   Sub-callus not bare, shining, tuberculous 14
13. Legs reddish-yellow, front tarsi darker. Abdomen yellowish . . . . . *tuberculatus* Ric.
   Legs black, tibiæ white. Abdomen reddish-brown or black . . . . *ceylonicus* Schin.
14 Femora black, tibiæ yellowish . . *fuscicauda* Big.
   Femora yellowish . . . . . *subhirtus* Ric.

Group XI.

1. Frons with 2 transverse calli, subcallus bare and shining. Abdomen black with white-haired bands . . *subcallosus* Ric.
   Frons with one callus. Subcallus not bare and shining 2
2. Frontal callus black, claviform, with spindle-shaped extension. Abdomen black, reddish at sides of basal segments. Segmentations yellow haired, often produced medianly as basal spots . . . . *hirtus* Ric.

Frontal callus small, indistinct. Abdomen black, only reddish on sides of 2nd segment, the whole covered with golden-yellow pubescence . . . .

[Not included in key : *T. ...*]

The following species, originally described from 'India Or', are not included in the catalogue of ... as they have been recognized, if at all, subsequently ... localities only, and were probably originally describ...

Species.	Synonyms.	Described from
basalis Macq. .	. .	India Or
brunneus Macq.	. .	India Or.
orientalis Wd. .	. .	East India
servillei Macq. .	*pynnata* Wlk. .	East India

4. Tabanus, Linnæus.

Tabanus, Linn., F. Suec., 462, (1761); Kert., Cat. Dipt., iii, 217; Ric., R. I. M., iv, 111-258, [revision of Oriental spp.]; Shiraki, Taihoku Expt. Stn. Bull., (1918), 119-123, 188-192 [Formosan spp.]; Patt. & Cragg, T. B. Med. Ent., 277-288, [key to Oriental spp.]: Szilady, Ent. Mitted., iv, 93; Surc., Gen. Ins. Fasc. 175, 54-65, [subdivisions]; Steinheil, Arb. Lab. Warschen, 1896, [abs. in Zool. Centralbl., iv, 873, (1897)] [mouth and method of suction]; Cornwall & Patt., I. Jo. Med. Res., ii, 569-93, [salivary secretion]; Hill, Bull. Ent. Res., xii, 41-59, figs., [bionomics of 3 Australian spp.]; Cragg, I. Jo. Med. Res., vii, 648-63, tabs. lxi-lxiii, [secretion and epithelial regeneration in mid-intestine]; Aust., Bull. Ent. Res., xii, 433-55, [Siamese spp. with key]; *id.*, *loc. cit.*, x, 292-321, [Palestine spp. with key].

Atylotus, O.-S., Mem. Boston N. H. S., ii, 126, (1876). Shiraki, Taihoku Expt. Stn. Bull., (1918), 162, [Formosan spp.].
[A valid sub-genus, used quite incorrectly by Bigot.]

Therioplectes, Zeller, Isis, xi, 819, (1842).
A valid sub-genus.

Bellardia, Rond., Arch. Zool Modena, iii, 79, (1863).
Invalid.

abscondens, Walker.

Tabanus abscondens, Wlk., Trans. Ent Soc., v, 275[1], (1860), Wulp. Cat. Dipt. S Asia, 60[2], Big, T. A. S. B. lx, 264[3]; Ric., R. I. M., iv, 161[4]; Kert., Cat. Dipt., iii, 217, Surc. Gen Ins. Fasc. 175, 58.

Burma[1, 2, 3]
N Chin Hills[4]
Dawnat Range (Tenasserim)[4]
———
China[4]

adjacens, Ricardo.

Tabanus adjacens, Ric., R. I. M, iv, 248[1], (1911); Surc, Gen Ins. Fasc 175, 58.

Perso-Baluchistan Frontier[1]

albocostatus, Bigot.

Atylotus albocostatus, Big, Mem Soc. Zool. Fr., v, 619[1], (1892)
Tabanus albocostatus, Wulp, Cat. Dipt. S. Asia, 63[2], Kert. Cat Dipt., iii, 219; Ric, R. I. M, iv, 190[3], [*albo-scutatus*, (*laps.*), in key on p. 122]; Surc., Gen. Ins. Fasc 175, 59

"India"[1, 2]

Not recognized since original description. Type redescribed by Ricardo.

albofasciatus, Ricardo.

Tabanus albofasciatus, Ric, R. I. M., iv, 146-7[1], (1911), Surc., Gen. Ins. Fasc. 175, 59.

Shillong[1]

angustilimbatus, Senior White.

Tabanus angustilimbatus, S. W., Spol. Zeyl., xii, 389[1], (1924)

Marlbe Valley (Ceylon)[1]

atrohirtus, Ricardo

Tabanus atrohirtus, Ric., R. I. M., iv, 209[1], (1911); Edw, F. M. S Mus Jo., viii, 28[2]; Surc., Gen Ins. Fasc. 175, 61.

Ceylon[1]
———
Sumatra (Mount)[2]

auriflamma, Walker.

Tabanus auriflamma, Wlk., Cat. Dipt. [illegible] P. M., [illegible] 1857 [illegible], Wulp, Cat. Dipt. S. Asia, 59; Bz., T. A. S. B [illegible] I., 261[3] Kert., Cat. Dipt. iii, [illegible] Ric., R. I. M., iv, 148-9[1] S. W., Mem. Dept. Agric. Ind., vii, 164[5]; Surc., Gen. Ins. Fasc. 175, 61.

[illegible]; Naga Hills[3,4]; [illegible]

auristriatus, Ricardo.

Tabanus auristriatus, Ric., R. I. M., iv, 161-2[1], (1911); Patton, I. Jo. Med. Res., x, 65[2]; Surc., Gen. Ins. Fasc. 175, 61.

Gersoppa (N. Kanara)[1]; [illegible][2]

[The Burmese record (S. W., Mem. Dept. Agric. Ind., vii, 165) is an error in determination.]

bicinctus, Ricardo.

Tabanus bicinctus, Ric., R. I. M., iv, 152-3[1], (1911); Shiraki, Taihoku Expt. Stn. Bull. (1918), 234-40, tab. v, 3[2]; I. C. Vet. Dept. Mem., ii, tab. vi, 5[3]; Fletcher & S. W., Proc. iv, Ent. Meetg. Pusa, 226; Patton, I. Jo. Med. Res., x, 67[4]; Surc., Gen. Ins. Fasc. 175, 62.

N. Kanara[1]; Mohand (U. P.)[3]; Coonoor[3]; [illegible] (S. Coorg); [illegible] (Coorg)

F. M. S.[4]; Formosa[2]

birmanicus, Bigot.

Atylotus birmanicus, Big., Mem. Soc. Zool. Fr., v, 653[1], (1892).

Tabanus birmanicus, Wulp, Cat. Dipt. S. Asia, 63[2]; Kert., Cat. Dipt., iii, 228; Ric., R. I. M., iv, 200-1[3]; Shiraki, Taihoku Expt. Stn. Bull, (1918), 420-4, tab. viii, 8, xi, 13-14[4]; Surc., Gen. Ins. Fasc. 175, 62.

Burma[1, 2, 3]; Lushai Hills[3]; Nongpoh (Khasia)[4]

F. M. S.[3]; Formosa[4]

brunnipennis, Ricardo.

Tabanus brunnipennis, Ric., R. I. M., iv, 160-1, tab. xiii, 9[1], (1911); Patel, Pusa Sci. Repts. (1919-20), 97[2]; Aust. Bull. Ent. Res., xii, 444[3]; S. W. Mem. Dept.

Basi (N. Kanara)[1]; Gorakhpur (U. P.)[2]; Pusa[3]; S. Malabar[3]

Agric. Ind., vii, 105[4]; Surc., Gen. Ins. Fasc. 175, 63. — Mohnyin (U. Burma)[4]
[Bistupur (Bankura District)
Puri
Sidapur (Coorg)
Khurda
Santikoppa (N. Coorg)
Polibetta (S. Coorg)
Ranchi
Samastipur (Bihar)
Kasaragode (S. Kanara)]

Siam[1, 3]

ceylonicus, Schiner.

Tabanus ceylonicus, Schin., Novara Reise, Dipt., 93[1], (1868); Wulp, Cat. Dipt. S. Asia, 61[2]; Kert., Cat. Dipt. iii, 233; Ric., R. I. M., iv, 223-4[3]; Surc., Gen. Ins. Fasc. 175, 64.
Tabanus nitidulus, Big., Mem. Soc. Zool. Fr., v, 679[4], (1892); Wulp, Cat. Dipt. S. Asia, 65; Kert., Cat. Dipt. iii, 265.

Ceylon[1, 2]
Trincomali (Ceylon)[3]

Malay Penin.[3]
Java[2, 4, 5]
Sumatra[3]

conicus, Bigot.

Atylotus conicus, Big., Mem. Soc. Zool. Fr., v, 650[1], (1892).
Tabanus conicus, Wulp, Cat. Dipt. S. Asia, 63[2]; Kert., Cat. Dipt., iii, 236.
Atylotus abbreviatus, Big., Mem. Soc. Zool. Fr., v, 670[3], (1892).
Tabanus abbreviatus, Wulp, Cat. Dipt. S. Asia, 63[4]; Kert., Cat. Dipt., iii, 217; Shiraki, Taihoku Expt. Stn. Bull., (1918), tab. vii, fig. 1[5]; Ric., R. I. M., iv, 153-4[6]; Surc., Gen. Ins. Fasc. 175, 58.

"India"[1, 2]
Calcutta[6]

Java[3, 4, 6]
Formosa[5, 6]
F. M. S.[6]

consanguineus Macquart.

Tabanus consanguineus, Macq., Dipt. Exot., i, 50[1], (1850); Big., J. A. S. B., lx, 264[2]; Wulp, Cat. Dipt. S. Asia, 59[3]; Ric., R. I. M., iv, 197-8[4]; Surc., Gen. Ins. Fasc. 175, 65; Kert., Cat. Dipt., iii, 236.

Malabar Coast[1, 2, 3, 4].

Tabanus fuscinervis, Macq., Dipt., Exot., i. 184, (1839).	
Atylotus nigromaculatus, Ric, A. M. N. H., (7) vi, 165,[19] (1900), Newst., Ann. Trop Med, (1907), 44.	Mauritius[1]
Tabanus pyrrhus, Wlk, Dipt Saunds., i, 47, tab. ii, 15, [20] (1850); Big, T. A. S. B., lx, 264, Wulp. Cat. Dipt S. Asia, 60, Coq, Proc. U. S. Mus, xxi, 311[21], Kert., Cat. Dipt., iii, 272.	Réunion[1].

diversifrons, Ricardo.

Tabanus diversifrons, Ric., R. I. M, iv, 214-5,[1] (1911); Surc., Gen. Ins. Fasc. 175, 66.	Shillong[1] Khasia, Lower Ranges[1] Buxar Duars[1] Sylhet[1] Darjiling District.[1] [Calcutta].

eggeri, Schiner.

Tabanus eggeri, Schin, Novara Reise Dipt., 81,[1] (1868); Kert, Cat. Dipt., iii, 239[2]; Ric., R. I. M., iv, 249[3]; Aust., Bull. Ento. Res. x, 294, 301.[5]	Pers Seistan[3] ——— South Europe[2] Asia Minor[2]
Tabanus intermedius, Egg., Verh zool.-bot. Ges Wien ix, 389, (1859), [*nec* Wlk. 1850]; Brauer, Denk Akad. Wien, xlii, 182, 42, tab. iii, vi, 42. Gob., Mem. Soc. Linn N. Fr., (1881), 21, 6; Pand., Rev. Entom., ii, 202, 4, Surc., Gen. Ins. Fasc 175, 72.	Egypt [1], [2] Palestine[5]

excelsus, Ricardo.

Tabanus excelsus, Ric, A M N H., (8) xi, 543,[1] (1913), Leese, Ind. Vet Dept. coll. Notes, 2, tab iv, 13[2]; S W, Mem. Dept Agric Ind., vii, 104[3], Surc., Gen. Ins. Fasc. 175, 67.	Mashobra[1] Mohand (U. P.)[2] Dehra Dun[3] Kangra Dist. (Crosse)

explicatus, Walker.

Tabanus explicatus, Wlk, List Dipt. B. M, v, 328,[1] (1854); Big., T A. S. B.,	Sikkim [1], [2] Khasia Hills[2]

iv, 264; Wulp, Cat. Dipt. S. Asia, 63; Kert., Cat. Dipt., iii, 240; Ric., R. I. M., iv, 191[2]; Surc., Gen. Ins. Fasc. 175, 67. — [illegible][2]

flavicinctus, Ricardo.

Tabanus flavicinctus, Ric., R. I. M., iv, 130-1,[1] (1911); C. Ver. Depr., Mem. ii, tab ii, 6[2]; Fletcher & S.W., Proc. iii Ent. Meetg., Pusa, 226; Surc., Gen. Ins. Fasc. 175, 68[3]. — [illegible][1], Nilgiris[2], N. Kanara, Malabar [illegible]

flavissimus, Ricardo. — Java[2]

Tabanus flavissimus, Ric., R. I. M., iv, 207[1], (1911); Surc., Gen. Ins. Fasc. 175, 68. — Pundaluoya

flaviventris, Bigot.

Atylotus flaviventris, Big., Mem. Soc. Zool. Fr., v, 657,[1] (1892). — Selangor [illegible]

Tabanus flaviventris, Wulp, Cat. Dipt. S. Asia, 63; Kert., Cat. Dipt., iii, 242; Ric., R. I. M., iv, 213-4;[2] Surc., Gen. Ins. Fasc. 175, 68. — Ceylon[2], ? Calcutta[2], ? Tenasserim, Bihar[4]

fulvimedius, Walker.

Tabanus fulvimedius, Wlk., List Dipt. B. M., i, 152.[1] (1848); Kert., Cat. Dipt., iii, 249; Ric., R.I.M., iv, 197[2]; Shiraki, Taiboku Expt. Stn. Bull., (1918), 399-407, tab. x, 14-15,[3]; Aust., Bull. Ent. Res. xii. 451 [Ric nec Wlk.]. Surc., Gen. Ins. Fasc. 175, 69. — ? Nepal[1], N. Chin Hills, 'India'[4, 5]

Atylotus melanopygatus, Big., Mem. Soc. Zool. Fr., v, 651,[4] (1892). — Formosa[2, 3]

Tabanus melanopygatus, Wulp, Cat. Dipt. S. Asia, 63; Kert., Cat. Dipt., iii, 260.

Atylotus pagodinus, Big., Mem. Soc. Zool. Fr., v, 654,[5] (1892).

Tabanus pagodinus, Wulp. Cat. Dipt. S. S. Asia, 63; Kert., Cat. Dipt., iii, 267.

fuscicauda, Bigot.

Atylotus fuscicauda, Big., Mem. Soc. Zool. Fr., V, 658,[1] (1892). — Ceylon[1, 2], Pundaluoya (C

Tabanus fuscicauda, Walp, Cat. Dipt. S. Asia, 63[2]; Kert., Cat. Dipt. iii, 244; Ric., R.I.M., iv, 217-8[3], S. W., Mem. Dept. Agric Ind., vii, 106[4]; Surc., Gen. Ins. Fasc. 175, 69.
? *Atylotus andamanicus*, Big, Mem Soc. Zool. Fr., v. 668.[5] (1892).
Tabanus andamanicus, Walp, Cat Dipt. S. Asia, 63,[6] Kert., Cat. Dipt, iii, 221; Surc., Gen. Ins. Fasc. 175, 60.
Miss Ricardo (m s) has cancelled her Sumatra record.

Shewgu (Burma)[4]
Peradeniya (Ceylon)[3]
Andaman Islands[5], [6]

fuscicrura, Bigot.

Tabanus fuscicrura, Big., Mem. Soc. Zool. Fr., v, 662,[1] (1892); Surc., Gen. Ins. Fasc. 175, 69[2].

Ceylon [1], [2]

Not recognized since its original description.

fuscomaculatus, Ricardo.

Tabanus fuscomaculatus, Ric., R. I. M., iv, 183-4,[1] (1911); S. W., Mem. Dept. Agric. Ind., vii, 106[2]; Surc., Gen Ins. Fasc. 175, 69, subsp. *altermaculatus*, Ric, A.M N H, (8) xi, 544,[1] (1913).

Myitkina Dist. (U Burma)[1]
Sikkim[1]
Masuri[2]
Kumaon[2]
Manipur[3]

glaber, Bigot.

Tabanus glaber, Big., Mem. Soc. Zool. Fr, v, 678[1] (1892), Walp, Cat. Dipt. S. Asia, 63; Kert., Cat Dipt., iii, 246; Ric., R. I. M., iv, 249-50, tab. xiv, 23;[2] Patton, I, Jo. Med. Res. vii, 738-9, tab. lxvii, 2, t. f. 1 (2)[3], Surc., Gen. Ins. Fasc. 175, 70

Helmand River (Afghanistan)[1], [2]
Kashgar[2]
Mesopotamia[3]
Persian Seistan[3]

hirtipalpis, Ricardo

Tabanus hirtipalpis, Ric., R. I. M., iv, 129,[1] (1911); Surc., Gen. Ins. Fasc. 175, 70.

Bichiakoh (Nepal)[1]

hirtistriatus, Ricardo.

Tabanus hirtistriatus, Ric., R.I.M., iv, 158-9,[1] (1911); Surc., Gen. Ins. Fasc. 175, 70.

Dawnat Range (Tenasserim)[1]

The Upper Burma record (S. W., Mem. Dept. Agric. Ind. vii, 105) is an error in determination. — F. M. S.[1]

hirtus, Walker

Tabanus hirtus, Wlk., Ins. Saund., i, 52.[1] (1850); Wulp, Cat. Dipt. S. Asia, 60; Kert., Cat. Dipt. iii, 249; Big., T.A.S.B., lx, 261; Gaiger, Jo. Trop. Vet. Sci., v, 69[2]; Surc., Gen. Ins. Fasc. 175, 71.

Therioplectes hirtus, Ric., R.I.M., iv, 228-9,[3] (1911).

India[1]
Phagu (Simla D.)[2]
Naini Tal D.[3]
United Provinces[2].
[Mukteswar (Kumaun)

hybridus, Wiedemann.

Tabanus hybridus, Wd., Auss. Zweifl. Ins., i, 557,[1] (1828); Wlk., Proc. Linn. Soc. Lond., i, 110[2]; Wulp, Cat. Dipt. S. Asia, 59,[3] Ric., R.I.M., iv, 162[4], *id.*, Bull. Ento. Res., vi, 407,[5] Surc., Gen. Ins. Fasc. 175, 71.

Burma[1]
Sylhet[4]
F. M. S.[4]
Borneo[2]
S. China[1, 3, 4, 5]

indianus, Ricardo.

Tabanus indianus, Ric., R.I.M., iv, 175-6,[1] (1911), Shiraki, Taihoku Expt. Stn. Bull., (1918) 284-94, tab. vi, 1[2]; Ric., Bull. Ento. Res., vi, 406[3]; de Mello, Proc. ivth. Ento. Meetg. Pusa, 41[4]; Surc., Gen. Ins. Fasc. 175, 71.

Kadra (N. Kanara)[1]
Goa (Port. India)[4]
[Santikoppa (Coorg)
Polibetta (Coorg)
Makut (Coorg)
Mercara (Coorg)
Poona]

? *Tabanus mentitus*, Wlk., List Dipt. B.M., i. 162,[5] (1848), Wulp, Cat. Dipt. S. Asia, 59.

Foochow (China)[5]
Formosa[1, 2]
Hong Kong[3]

indiscriminatus, Ricardo.

Tabanus indiscriminatus, Ric., Arch. Naturgesch. lxxx, (A8) 123,[1] (1915).

Ceylon[1]

joidus, Bigot.

Atylotus joidus, Big., Mem. Soc. Zool. Fr., v, 657,[1] (1892).

Tabanus joidus, Wulp, Cat. Dipt. S. Asia, 63; Kert., Cat. Dipt., iii, 252, Ric., R.I.M., iv, 211-2[2]; Surc., Gen. Ins. Fasc. 175, 72.

Sibsagar (Assam)[1]

jucundus, Walker.

Tabanus jucundus, Wlk. List Dipt. B. M., i, 187,[1] (1848) : Wulp, Cat. Dipt. S. Asia, 60 ; Ric., R.I.M., iv, 164-5, tab. xiii, 10[3], *id.*, Bull. Ento. Res., vi, 407[4] ; C. Vet. Dept. Mem. ii, tab. iv, 12[5] ; Fletcher & S.W., Proc. ivth. Ento. Meetg. Pusa, 226 ; S. W., Mem. Dept. Agric. Ind., vii, 105[6] ; Surc., Gen. Ins. Fasc. 175, 72.

Pundaluoya (Ceylon)[3]
Kohat N. W. F. P.[3]
Masuri [3], [4]
Igatpuri[5] (W. Ghats)
Mohand (U. P.)[6]
— — — — —
Hong Kong[1], [4]

kakhyenensis, Senior White.

Tabanus kakhyenensis, S. W., Mem. Dept. Agric. Ind., vii, 113, tab. xii,[1] (1922), 104, [note].

Mohnyin[1]
N. Toungoo[1]
Pyinmana[1]
(all U. Burma)

khasiensis, Ricardo.

Tabanus khasiensis, Ric., A.M.N.H., (8) iii, 487,[1] (1909) ; *id.*, R.I.M., iv 193-4[2], Surc., Gen. Ins. Fasc. 175, 72

Khasia Hills [1], [2]
Meerut[2]
— — — — —
Sinahang (Siam)
Penang
(B. M. colln.)

leleani, Austen.

Tabanus leleani, Aust. Bull. Ento. Res., x, 312-6, figs. 13, 14,[1] (1920) ; Surc., Gen. Ins. Fasc. 175, 73 ; *id.*, Ann. Soc. Ent. Fr., xci, 238, [bionomics], Aust., Bull. Ento. Res., xiii, 287[2] ; *id.*, *loc. cit.*, xvi, 17.

Kangra Valley[1], [2]
[Seistan
Quetta
Attock
Near Srinagar (Kashmir)]
— — — — —
Algeria to Mesopotamia[1], [2]

leucocnematus, Bigot.

Atylotus leucocnematus, Big., Mem. Soc. Zool. Fr., v, 656,[1] (1892).

Tabanus leucocnematus, Wulp, Cat. Dipt. S. Asia, 63,[2] [*leucocnematus*, laps.], Kert., Cat. Dipt., iii, 254 ; Ric., R. I. M., iv, 131-2[3] ; Patton, I. Jo. Med. Res., x, 67[4], S. W., Mem. Dept. Agric. Ind., vii, 104[5], Surc., Gen. Ins. Fasc. 175, 73.

India[1], [2]
Lushai Hills[3]
Khasia Hills[3]
Coonoor[4]
Katha (U. Burma)
[Darjiling]

leucohirtus, Ricardo.

Tabanus leucohirtus, Ric., A.M.N.H., (8) iii, 488,[1] (1909); *id.*, R.I.M., iv, 208-9[?]; Surc., Gen. Ins. Fasc. 175, 74.
Kanara [illegible]

leucopogon, Bigot.

Atylotus leucopogon, Big., Mem. Soc. Zool. Fr., v, 651,[1] (1892).
Sikkim[1], [2]

Tabanus leucopogon, Wulp, Cat. Dipt. S. Asia, 63; Kert., Cat. Dipt. iii, 234; Ric., R.I.M., iv, 184, tab. xiv, 1[2]; Surc., Gen. Ins. Fasc. 175, 75.

macer, Bigot.

Atylotus macer, Big., Mem. Soc. Zool. Fr., v, 649,[1] (1892), [♀ only].

Tabanus macer, Wulp, Cat. Dipt. S. Asia, 62; Ric., R.I.M., iv, 223; Aust., Trans. R.S.T.M. & H., xv, 251,[8] [abs. R.A.E. (B) x, 143]; Isaac, Mem. Dept. Agric. Ind., ix, (2) 21, tab. v, 1, 6, vi, 1, 1a, vii, 1, viii, 1a-d, [bionomics].

India[1]
Jhelum Dist.[2]
Pusa[5], [6]
Goa (Port. India)
Mohand (U. P.)[8]

Tabanus bicallosus, Ric., A.M.N.H., (8) iii, 489-90,[3] (1909); *id.*, R.I.M., iv, 129-30,[4] (1911); Patt. & Cragg, T.B. Med. Ent., 295, [feeding point], 297, [oviposition], tab. xlii, 1-6; Fletcher, Pusa Sci. Repts., (1916-17), 96, [oviposition]; Patel, *loc. cit.*, (1919-20), 97, [do]; Fletcher, *loc. cit.*, (1920-21), 47, 48, [parasites]; de Mello, Proc. ivth. Ento. Meetg. Pusa, 41,[5] [?]; C. Vet. Dept. Mem. ii, 4, tab. i, 2[6]; Fletcher & S. W., Proc. ivth. Ento. Meetg. Pusa, 226; Surc., Gen. Ins. Fasc. 175, 62.

Trichinopoly[7]
Pathankot ([illegible]
[Murree
Kathgodam
Dogam
Rawalpindi
Chamba State (Pu
Nagpur
Dharwar
Coimbatore
Taliparamba (N. Malabar)
In train between
eswaram and Ma

Tabanus trichinopolis, Ric., A.M.N.H., (8) xiv, 359-60,[7] (1914).

manipurensis, Ricardo.

Tabanus manipurensis, Ric., A.M.N.H., (8) xi, 544,[1] (1913); Surc., Gen. Ins. Fasc. 175, 75.
Manipur[1]

melanognathus, Bigot.

Atylotus melanognathus, Big. Nouv. Arch. Mus. H.N. Paris, (3) ii, 204.[1] (1890)
Tabanus melanognathus, Wulp. Cat. Dipt. S. Asia, 62 ; Ric., R.I.M., iv, 226[2].
Tabanus nonoptatus, Ric., R.I.M., iv, 140-1,[3] (1911) , Surc , Gen. Ins. Fasc. 175, 77

Parneah (N. Bengal)[3]
Laos (Siam)[1, 2]

monotæniatus, Bigot.

Atylotus monotæniatus, Big , Mem. Soc. Zool Fr., v, 655,[1] (1892).
Tabanus monotaeniatus, Wulp, Cat. Dipt. S Asia, 63[2] , Kert., Cat. Dipt , iii, 262 ; Ric , R.I M , iv, 159-60[3] ; *id.*, *loc cit* , iv, 101[4] , S W , Mem Dept. Agric. Ind., vii, 105[5] , Surc., Gen. Ins. Fasc. 175, 76

India[1, 2].
N. Khasia Hills[3]
Nongpoh (Khasia)[3]
Sibsagar (Assam)[3]
Yunnan[4]
Mohnyin (U Burma)[5]

nemocallosus, Ricardo

Tabanus nemocallosus, Ric , A M N H , (8) iii, 490,[1] (1909) ; *id.*, R.I.M , iv, 137[2] ; Fletcher, Pusa Sci. Repts , (1915-16), 79, [bionomics] ; *id.*, *loc. cit.*, (1916-17), 97, [do] , Patel, *loc. cit.*, (1919-20), 97, [notes] ; Aust., Trans R.S.T M. & H , xv, 264, [abs. R A E (B), x, 113] , Surc . Gen Ins. Fasc. 175, 76 ; Isaac, Mem. Dept. Agric. Ind., ix (2), 24, tab v, 5, vi, 6, 6a, vii, 6, x, 6a-e, [bionomics].

Pusa[1, 2].
Jhelum Dist.[3]

nephodes, Bigot.

Atylotus nephodes, Big , Mem Soc. Zool Fr., v, 656,[1] (1892)
Tabanus nephodes, Wulp, Cat. Dipt. S. Asia, 63 ; Kert., Cat Dipt. iii, 264 ; Ric., R I M., iv, 145-6 , Surc , Gen Ins. Fasc. 175, 77.
Tabanus salvazai, Surc. Bull Soc. Ent . Fr. (1921) (19) 286, (Dec. 1921 or Jany. 1922), [var].

Naga Hills[1]
Sibsagar (Assam)[1]

nicobarensis, Schiner

Tabanus nicobarensis, Schin., Novara Reise Dipt., 81,[1] (1868); Walp. Cat. Dipt. S. Asia, 61; Kert. Cat. Dipt., iii, 261; Ric., R.I.M. iv, 191-2[2]; Surc., Gen. Ins. Fasc. 175, 77. — Nicobar Islands[1, 2]

nigropictus, Macquart

Tabanus nigropictus, Macq., Dipt. Exot., suppl. v, 24,[1] (1855); Walp. Cat. Dipt. S. Asia, 60; Kert. Cat. Dipt., iii, 265; Big., T.A.S.B., lx, 261; Ric., R.I.M., iv, 210-11[2]; Surc., Gen. Ins. Fasc., 175, 77. — India[1, 2].

[Not recognized since original description. Type redescribed by Ri

obconicus, Walker.

Tabanus obconicus, Wlk., Dipt. Saunds., i, 54[1] (1850); Walp. Cat. Dipt. S. Asia, 60; Kert., Cat. Dipt. iii, 266; Big., T.A.S.B., lx, 264; Ric., R.I.M. iv, 215-6[2]; Surc., Gen. Ins. Fasc. 175, 77. — Central India[1], Bombay[2], Belgachia (Bengal)[2]

optatus, Walker.

Tabanus optatus, Wlk. Proc. Linn. Soc. Lond., i, 111, 33,[1] (1856); Walp. Cat. Dipt. S. Asia, 61[2]; Ric., R.I.M., iv, 139[3]; Pratt, Jo. Trop. Vet. Sci., 396-4,[4] [F. M. S. distribution]; Edw., Jo. F. M. S. Mus., viii, 27[5]; Surc., Gen. Ins. Fasc. 175, 78. — Belgachia (Bengal)[3] [Bangaon (Bhagalpur Dist.)]; F. M. S.[4]; Sumatra[3, 5, 7]; Borneo[1, 2, 6]

Tabanus alboscutatus, Rond. Ann. Mus. Civ. Genoa, vii, 156,[4] (1875).

Tabanus equestris, Wulp, Leyden Mus. Notes, vii, 77, 31, tab. v, 6, (1885).

orientis, Walker.

Tabanus orientis, Wlk., List Dipt. B. M., i, 152,[1] (1848); Walp. Cat. Dipt. S. Asia, 59; Kert. Cat. Dipt., iii, 267; Big., T.A.S.B., lx, 261[5]; Ric., R.I.M., iv, 195-7[3]; Baldrey, Jo. Trop. Vet. Sci., vi, 271-282[4] [surra transmission expts.]; C. Vet. Dept. Memo. ii, tab. — Nepal[1, 4], United Provinces[2], Naini Tal[3], Thandiani (Himalay…, W. Bhutan[5], Masuri[3], Dongargalli (Nagpur)[2]

iii, 18[5], Fletcher & S. W., Proc. 3rd Ento Meetg. Pusa, 226 ; Surc. Gen. Ins. Fasc. 175, 78 ; Ric., R. I. M., iv, 101.[2]	Yunnan[3] Muktesar[4] Mokami[5]
Tabanus consocius, Wlk., Dipt. Saunds., i, 56. (1850) ; Big., T.A.S.B., lx, 264 ; Wulp. Cat. Dipt. S. Asia, 60 ; Kert., Cat. Dipt., iii, 226 ; Gauger, Jo. Trop. Vet. Sci., v, 69 ; Aust., Trans. R.S.T. M. & H., x, 251,[7] [abs. R.A.E. (B) x, 133.]	Sikkim[6] Jhelum Dist.[7] Kangra Dist. (Crosse) [Dalhousie]
Tabanus pellinus, Wlk. Dipt. Saunds., i, 56. (1850) ; Big. T.A.S.B., lx, 264 ; Wulp. Cat. Dipt. S. Asia, 60 ; Kert., Cat. Dipt. iii, 268	

The Burmese locality, (S. W. Mem. Dept. Agric. Ind., vii, 106), is an error in determination.

oxyceratus, Bigot.

Atylotus oxyceratus, Big., Mem. Soc. Zool. Fr., v, 652,[1] (1892).	India[1]
Tabanus oxyceratus, Wulp. Cat. Dipt. S. Asia, 63 ; Kert., Cat. Dipt., iii, 267 ; Ric., R.I.M., iv, 195[2] ; S. W. Mem. Dept. Agric. Ind., vii, 106[3] ; Surc., Gen. Ins. Fasc. 175, 78	Cheena Forest (Himalayas)[2] N. Chin Hills[2] Masuri[2], [3]

provincialis, Ricardo.

Tabanus provincialis, Ric., A. M. N. H., (8) xi, 545,[1] (1913) ; Surc., Gen. Ins. Fasc. 175, 80	Arian Kava (Travancore)[1] Kurseong[1]

pulchellus, Loew.

Tabanus pulchellus, Lw., Verh. zool.-bot. Ges. Wien, viii, 597, 26,[1] (1858) ; Brauer, Denk. Akad. Wien, xlii, 200, 60 ; Kert., Cat. Dipt., iii, 271[2] ; Ric., A. M. N. H., (7) xvi, 200 ; Patton, I. Jo. Med. Res., vii, 736 8, tab. lxvii, I, and fig. 1 (1).[3] [probably local race of *dalmatinus* Macq.] ; Surc., Gen. Ins. Fasc. 175, 80	Seistan[4] Mesopotamia[1], [3] Asia Minor[2] N. Africa[2] Cyprus[2] Perso-Afghan Frontier[4]
Tabanus cyprianus, Ric., R. I. M., iv, 218-9,[1] (1911).	

virgatulus Aust possibly only forms]: Surc., Gen Ins. Fasc. 175, 82 ; Isaac, Mem. Dept. Agric. Ind., ix (2) 22, tab. v, 2, 2a, 3, vi, 2, 2a, vii, 2, viii, 2a-c, [bionomics]; *id.*, *loc. cit.*, viii. 93, tab. xi, [larva].

Tabanus albimedius, Wlk., Dipt. Saunds., i, 48 [8] (1850) ; Big., T. A. S. B., lx. 264 ; Wulp, Cat Dipt. S Asia, 60 , Kert. Cat. Dipt., iii, 219 , Ric., R. I. M., iv, 156-7, tab xiii, 8[9] ; Brun., Spol. Zeyl. vi, 170 ,[10] Baldrey, Jo. Trop Vet. Sci., vi, 271-82,[11] [transmission expts., ? sp.] : Cragg, I. Jo. Med. Res., vii, 618-63, tabs. lxi-lxiii. [intestine], Cornwall & Patton, *loc. cit.*, ii 569-[illegible], [salivary secretion]: Ric., Bull. Ent. Res., vi. 405[12] ; Howlett, Ind. Ins. Life, tab. lxii, 1-1c, [life history] , *id* . Pusa Sci Repts., (1909-10), 71 , Fletcher, *loc. cit* , (1915 16) 80, [bionomics], 82. [surra], *id* , *loc. cit.*, (1916 17), 96, [oviposition]; Patel, *loc. cit* , (1919-20). [parasites]; Fletcher, *loc. cit.*, (1920-21), 47 48, [do]; Patt. & Cragg. T. B. Med. Ent., tab. ii, 7. [antenna], xiv, 2. [thorax], xv, 4, [medifurca], xviii, 5 [genitalia], xxvii, 9, [salivary gland], 288-9, 291. [feeding point] 297, [oviposition]: Longstaff, ' Butterfly Hunting,' 303[15] ; de Mello, Proc. ivth. Ento Meetg. Pusa, 41[14] ; Aust., Trans. R.S.T M. & H., xv, 261,[15] [abs R A E. (B) x, 113] , S. W., Mem. Dept Agric. Ind , vii, 105[16] ; Surc., Gen. Ins. Fasc. 175, 59.

Tabanus calidus, Wlk , Dipt. Saunds , i, 57,[17]. (1850) ; Wulp, Cat Dipt. S. Asia, 60.

Hybotus lachrymans. Big., Mem. Soc. Zool. Fr., v, 669,[18] (1892).

Muktesar[11]
Mattaran (W. Ghats) [13]
Goa (Port Ind)[14]
Jhelum Dist [15]
Masuri[16]
Dharmsala (Cragg)
Kangra (Cragg)
D Ghazipur (Cragg)
[Hopin (Upper Burma)
Chapra (Bihar)
Buxar (Bihar)
Coimbatore
Rawalpindi
Taru, near Peshawar
Giridih
Khurda, Khurda
Khasi Hills
Bareilly
Midnapur
Kalimur
Nongpoh (Assam)
Manbhum
Delhi
Cuttack
Dera Ismail Khan
Dumraon (Bihar)
Kasargode (S Kanara)]

' ? Asia '[17]
Java[3, 18, 20]
Sumatra[4, 8]
F M S[4, 7, 21]
Siam[4, 7]
Hong Kong[5, 7, 12]
Cochin China[4]
Annam[7]

(1915-16), 80 . Patel, *loc. cit.* (1919-20). 97, [parasites]; Sure , Gen Ins. Fasc. 175, 83

sexcinctus, Ricardo

Tabanus sexcinctus, Ric., R I M , iv, 133,[1] (1911) . Shiraki, Taihoku Expt. Stn Bull , (1918) 231-10, tab v 2[2], S W , Mem Dept. Agric. Ind vii. 104[3] Surc Gen Ins Fasc. 175, 83

Lushai Hills[1]
Masuri[3] [? sub-form]
————
Formosa[2]

speciosus, Ricard.

Tabanus speciosus, Ric , R. I M , iv, 157-8,[1] (1911) . Patton & Cragg, T. B. Med Ent 289, tab xl. 291, [feeding point], 297, [oviposition]; Surc. Gen. Ins , Fasc. 175, 81.

Travancore[1]
Trinco Dist.[1] (Ceylon)
Madras (B. M. colln.)
[Hazaribagh (Bihar)
Angul
Bombay
Cuddapah (Madras Pres)
Chapra
Khurda
Santikoppa (N Coorg)
Coimbatore
Dumraon
Buxar
Bhagalpur.

striatus, Fabricius

Tabanus striatus, Fb., Syst Ent., iv. 371,[1] (1794) ; *id* , Syst Antl , 103 , Aust , Bull Ent , Res , xii, 415[2] , *id*., Trans R. S. T. M. & H., xv, 264 ; Isaac. Mem Dept. Agric Ind., viii, 97-109, tabs. xii-xv, [bionomics, larval structure, adult genitalia]

Tabanus hilaris, Wlk , Dipt Saunds i, 49 tab ii. 3,[1] (1850) , Big., T A S B , lx, 264 , Walp. Cat Dipt. S. Asia, 60[5] , Kert , Cat. Dipt , iii, 249 , Ric., R. I M iv, 153[6] , *id* , Bull Ent Res , vi, 407[7] , Patt & Cragg, T. B Med. Ent. 294, [feeding point], 297 [oviposition] , Patt , Arch. f. Protist , xv, 333-62, [*Crithidia tabani*] , Fletcher, Pusa Sci. Repts., (1915-16), 80 ; Patel, *loc*

Kohat[2]
Jhelum D [2]
E India [1], [5]
Pusa[6]
Punjab[6]
Bombay[9]
[Hissar (Punjab)
Belgachia (Bengal)
Midnapur
Angul
Monghyr
Rawalpindi
Lahore
Bhagalpur
Suri
Cuttack
Daltonganj (Bihar)

cit., (1919-20), 97 : Surc. Gen. Ins. Fasc. 175, 70
Tabanus partitus, Wlk., Proc. Linn. Soc. Lond., i, 9,[8] (1856); Wulp, Cat. Dipt. S. Asia, 60 ; Lefroy, Pusa Bull. 7, 21[9]; Fraser, Jo. Trop. Vet. Sci., iv, 373, 375, 381-2 [infection expts., f. sp.]; Pratt, *loc. cit.*, v, 390-4,[10] [F. M. S. distribution]. Gaiger, *loc. cit.*, v, 69.
Tabanus rufocallosus, Big., Mem. Soc. Zool. Fr., v, 679,[11] (1892); Wulp, Cat. Dipt. S. Asia, 63.

Darjiling
Burdwan
Purulia
Ludhiana (Punjab)
Kathgodam
Coimbatore.]

subcallosus, Ricardo.

Therioplectes subcallosus, Ric., R. I. M., iv, 227-8,[1] (1911).
Tabanus subcallosus, Baldrey, Jo. Trop. Vet. Sci., vi, 271-282,[2] [transmission expts.]; Surc., Gen. Ins. Fasc. 175, 85

Masuri[1]
Dalhousie[1]
Mukteswar[2]
[Dogaon
Meerut
Muzaffarnagar
Dera Dun (U. P.)
Pokokku (Burma)
Dalhousie
Dunera hills (Gurdaspur District)
Kangra (Punjab)
Amparad (near Mukteswar).]

subcinerascens, Ricardo.

Tabanus subcinerascens, Ric., R. I. M., iv, 215,[1] (1911); Surc., Gen. Ins. Fasc. 175, 85.

N. Chin Hills[1]

subhirtus, Ricardo.

Tabanus subhirtus, Ric., R. I. M., iv, 219,[1] (1911); Surc., Gen. Ins. Fasc. 175, 85.

Bengal[1]
Bombay[1]

Atylotus cinerascens, Big., Mem. Soc. Zool. Fr., v, 669,[2] (1892), [*nec* King 1827].
Tabanus cinerascens, Wulp, Cat. Dipt. S. Asia, 63 ; Kert., Cat. Dipt., iii, 231.

Java[2]

s, Jaennicke.

Tabanus sufis, Jaenn , Abhandl Senck. Naturf. Ges., vi, 332. 24,[1] (1867); Verral, Br. Flies, v, 9 syst list app.) 11.[2]	Punjab (B. M. Colln.) ———— N. Africa[1,2]. E. Africa[2]
Tabanus alboventralis, News.	

ebrosus, Walker.

Tabanus tenebrosus, Wlk. List Dipt B. M., v, supp. i, 242, 389,[1] (1854); Big., T. A S. B., lx, 264; Wulp, Cat. Dipt. S. Asia, 60 . Kert., Cat. Dipt., iii, 285 , Ric., R I. M., iv, 203-4 ,[2] Surc , Gen. Ins. Fasc. 175, 86.	Kanara[1, 2]

Not recognized since original description. Type redescribed by Ricardo].

ens, Walker.

Tabanus tenens, Wlk , Dipt Saunds , i, 49,[1] (1850) , Wulp, Cat Dipt S. Asia, 60; Gaiger, Jo. Trop. Vet Sci , v, 69; Aust , Bull. Ent. Res., xii, 445,[2] [synonomy] Big., T A. S. B., lx, 264 , Kert., Cat Dipt , iii, 285; Lefroy, Pusa Bull. 7, 21[3]; Isaac, Mem. Dept. Agric. Ind., viii. 97, tabs xii-xiv, [larval structure]; *id.*, *loc.*, *cit* , ix, 23, tab. v, 4, vi, 4, 4a, vii, 4, ix, 4a-e, [bionomics]	E. India[1] Ceylon-general[2, 8] Bassein[3, 8, 9] (Bomb Madras[2] Pusa[8] Bengal-general[8, 13] Burma[8] Gonda D (U P)[8] E. Coast[8, 12] Sylhet[8]
? *Tabanus chinensis*, Thun., N. Acta R. S. Upsala, ix, 53, 62, (1827); Bezzi, Wien. Ent. Zeit., xxvii, vols. ii & iii, (1908)	Manipur[8] Mohmand Pass (N. F P)[8]
? *Tabanus costalis*, Licht , Cat. 213, Hamburg, (1796); Aust., A. M. N. H., (8), i, 346	S India-general[10] Goa (Port Ind)[11] Dehra Dun[13]
Tabanus dorsilinea, Wd , Anal. Ent., 22, 10, (1824); *id.*, Ausser. Zweifl Ins , i, 184, 10 , Big., T A S. B , lx, 264, [*dorsolineae*, laps].	[Kasargodu (S. Kanara) Coimbatore Berhampur
? *Tabanus manilensis*, Schin, Novara Reise Dipt , 84, (1868)[15]; Wulp, Cat. Dipt. S. Asia, 61.	———— Java[4, 6] Sumatra[5, 6]

Tabanus angustus, Wulp, Cat. Dipt. S. Asia, 63, Kert., Cat. Dipt., iii, 221, Surc., Gen. Ins. Fasc. 175, 60
Tabanus palpalis, Ric., R. I. M., iv, 212-3, tab. xiv, 19, 20[1], (1911), [*nec* Brethès, 1909].
Not recognized since original description. Type redescribed by Ricardo.

[...]icus, auct. Ind. *nec* Panzer (1791)

Tabanus tropicus, Lingard, Jo. Trop. Vet. Sci., i, 92-112[1], Baldrey, *loc. cit.*, vi, 271-82[1], [transmission expts.], Schat. S. S. Bur. Bull., 15, vol. ii[3], [transmits surra]; Waterho. in Aitch., Zool. Afghan Delimit. Comm., 131[4]	Kathgodam[1] Muktesar[2] (both Himalaya) Padda Sultan (Helmar[...] ——————— Java[3]

These records probably refer to more than one species. Unless the specimens with which these authors worked can be found, the references will have to remain doubtful.

[...]erculatus, Ricardo

Tabanus tuberculatus, Ric., R. I. M., iv, 220-1[1], (1911), Surc., Gen. Ins. Fasc., 175, 87.	Companiganj (Sylhet) Belgatchia (Bengal)[1] Pusa[1] [Villupuram (S. Arcot[...] Stchanda (Kistna)]

[...]o, Wiedemann.

Tabanus virgo, Wd., Anal. Ent., 22[1], (1824), *id.*, Ausser. Zweifl. Ins., i, 184; Big., T. A. S. B., lx, 264; Wulp, Cat. Dipt. S. Asia, 59[2], Kert., Cat. Dipt., iii, 292, Ric., R. I. M., iv, 136[3], Patt. & Cragg, T. B. Med. Ent., 297, [oviposition], tab. xlii, 13-16, Fletcher, Pusa Sci. Repts., (1916-17), 96, [oviposition], Patel, *loc. cit.*, (1919-20), 100; C. Vet. Dept. Mem. 2, tab. ii, 7[4], Fletcher & S. W., Proc., ivth. Ento. Meetg. Pusa, 226; Aust., Trans. R. S. T. M. & H., xv, 264[7], [abs. R. A. E. (B), x, 143], Surc., Gen. Ins. Fasc.	India[1, 2, 5, 6] Madras[1] Mysore[3] Calcutta[3] Pusa[3] Mohand (U. P.)[4] Jhelum Dist.[7] Vizianagram (S. W.) D. Ghazipore (Crosse[...] Kangra (Crosse) Kotla (Crosse) [Chapra (Bihar) Chicacole Road (Mad[...] Presidency)

175, 88, Isaac, Mem. Dept. Agric. Ind., ix (2) 21, tab. vi. 5. vii, 5, x, 5a-c, [bionomics].
Tabanus albulus, Wlk., Dipt. Saunds., i, 46[5], (1850); Big., T. A. S. B., lx 264; Wulp, Cat. Dipt. S. Asia, 60; Kert., Cat. Dipt., iii, 220.
Tabanus puella, Wlk., Dipt. Saunds., i. 53[6], (1850); Big., T. A. S. B., lx, 261; Wulp, Cat. Dipt. S. Asia, 60; Kert., Cat. Dipt., iii, 271.

Suri (Bihar)
Sohawa (Punjab)
Hazaribagh
Rawalpindi
Kharda
Cuttack
Bareilly
Purulia (Bihar)
Angul
Bhowrah (Champaran)]

wyvillei, Ricardo.
Therioplectes wyvillei, Ric., R. I. M., iv, 229-30[1], (1911).
Tabanus wyvillei, Surc., Gen. Ins. Fasc. 175, 88.

Narkanda[2]
Karauli[1] (both W. Himalaya)

5. Neotabanus, Ricardo.

Neotabanus, Ric., R. I. M., iv, 363, (1911); Surc., Gen. Ins. Fasc. 175, 93.
There is an invalid sub-genus of *Tabanus* of the same name, erected by Lutz.

ceylonicus, Ricardo.
Neotabanus ceylonicus, Ric., R. I. M., iv, 363-4[1], (1911); Surc., Gen. Ins. Fasc. 175, 93

Pundaluoya (Ceylon Mts.)[1]

PANGONINAE.

Ric., A. M. N. H., (7) v, 105-121 167-181, [revision, tables of genera]; Shiraki, Taihoku Expt. Stn. Bull., (1918), 9, [notes on sub-family]; Surc., Gen. Ins. Fasc. 175, 94-5, [key to genera of World].

6. Corizoneura, Rondani.

Corizoneura, Rond., Arch. Zool. Anat. Fisiol., iii, 85, (1864); Ric., R. I. M., iv, 365; Shiraki, Taihoku Expt. Stn. Bull., (1918), 17-18; D.-Brock., Bull. Ento. Res., i, 55-6, [an African

sp. a bad animal biter]; Aust, *loc. cit.*, xi, 139, [the sub-divisions of *Pangonia* Latr.]; Patton & Cragg, T. B. Med. Ent, 294; Surc., Gen. Ins. Fasc. 175, 125.

KEY TO THE INDIAN SPECIES OF *CORIZONEURA*.

Proboscis much longer than the whole body	2
Proboscis scarcely longer than the body .	*taprobanes* Wlk.
First two joints of front tarsi modified, widened in both sexes.	*longirostris* Hardw.
First two joints of front tarsi simple .	*longirostris* var. *varipes* Ric.

ngirostris, Hardwicke.

Pangonia longirostris, Hard., Trans. Linn. Soc Lond., xiv, 135, tab vi, 5, 6[1], (1823); Wd., Ausser Zweifl. Ins., ii, 621, 14[2], Gay in Griff., Cuvier's Règ. Anim, xv, tab cxiv, 3, Macq., Ann. Soc Ent. Fr, vi, 429, tab. xv. 20-23; Wlk., List Dipt. B. M, i, 131, *id.*, *loc. cit.*, v, suppl. i, 139. 101; Roder, Stettin. Ent. Zeit., xlii, 384[3], [redescr.]; Wulp, Cat. Dipt. S Asia, 64; Kert, Cat Dipt., iii, 173; Ric., A. M. N. H., (7)v, 167-8; Tetle, Bull. Ento. Res., viii, 253-267, tab. vi, 11t. figs., [structure of mouth parts], Howlett, Ind. Ins. Life, tab. lxii, 3.

Corizoneura longirostris, Ric., R. I. M., iv. 365-6[4], Mitter, I. Jo. Med Res., v, 522-8, tab, [method of feeding]; Big, T. A. S B. lx, 264; Aust., Bull. Ento Res., xi, 139-152; Surc., Gen. Ins. Fasc 175, 134.

subsp. **varipes**, Ric, R. I. M., iv, 367[5], (1911).

Pangonia amboinensis, auct. *nec.* Fab., Big., T. A. S. B., lx, 264, Wulp Cat. Dipt. S. Asia, 64[7]; Ric., R. I. M., iv, 369.

Nepal[1, 2]
Allahabad[3]
Muktesar (Himalay
Tibet[4]
Sikhim[5, 6, 7]
Trivandrum (Tra core)[5]
Sadiya Dist. (Assam
Shillong
Simla.
Masuri.

ater, Saunders

Gastroxides ater, Saund., Trans. Ent. Soc. Lond., iii, 59, tab. v, 1[1], (1841); *id.*, *loc. cit.*, iv, 225, tab. xiv, 3; Wlk., List Dipt. B. M., i, 209; *id.*, *loc. cit.*, v, suppl. i, 293, 1; Lw., Dipt. Fauna Süd Afrik., i, 15; Wulp, Cat. Dipt. S. Asia, 64[2]; Ric., A. M. N. H., (7) viii, 298; *id.*, *loc. cit.*, (7) xiv, 372; Kert., Cat. Dipt., iii, 181; Ric., R. I. M., iv, 370-1[3], tab. xvi, 9; Howlett, Ind. Ins. Life, tab. lxii, 4; Fletcher, Pusa Sci. Repts., (1915-16), 81, [bionomics]; *id.*, *loc. cit.*, (1920-21), 21, 49, [tree-hole breeder]; Surc., Gen. Ins. Fasc. 175, 137, tab. v, 6a-b; Isaac, Mem. Dept. Agric. Ind., ix (2), 25, tab. vi, 3, vii, 3, ix, 3a-e, [bionomics].

Central India[1], [2]
Calcutta[4]
Pusa[5]
Coimbatore (B. M. colln.)
[Chapra
Fyzabad (U. P.)
Surat]

ornatus, Bigot

Dialyomyia ornatus, Big., Rev. et Mag. Zool., (2) xi, 306[1], (1859); Wulp, Cat. Dipt. S. Asia, 63

Ceylon[1]
Colombo[2]

Gastroxidus ornatus, Ric., A. M. N. H., (7) xiv, 372; Kert., Cat. Dipt., iii, 181; Ric., R. I. M., iv, 371-3[2]; Surc., Gen. Ins. Fasc. 175, 137.

Heneratgoda (Ceylon plains[2])

8. Silvius, Meigen.

Silvius, Meig., Syst. Besch., ii, 27, (1820); Wd., Ausser. Zweifl. Ins., i, 93; Macq., Dipt. Exot., I, i, tab. vi, 1; Schin., F. Austr., i, 43; Ric., A. M. N. H., (7) viii, 290; Surc., Bull. Mus. H. N. Paris, ii, 46; Kert., Cat. Dipt., iii, 177; Ric., R. I. M., iv, 373; Shiraki, Taihoku Expt. Stn. Bull., (1918), 10; Patton & Cragg, T. B. Med. Ent., 292; Hill, Bull. Ent. Res., xii, 59-62, figs., [bionomics of an Australian sp.], Surc., Gen. Ins. Fasc. 175, 141.

Erodiorhynchus, Macq., Dipt. Exot., I, i, 111, tab. vi, 1, (1838)

? *Philoliche*, Wd., Ausser. Zweifl. Ins., I, 95, (1828).

indianus, Ricardo

Silvius indianus, Ric., R. I. M., iv, 374, (1911); Surc., Gen. Ins. Fasc. 175, 143. — Bhura (Naini Tal D.)[1]

9. Melissomorpha, Ricardo

Melissomorpha, Ric., Proc. Zool. Soc. Lond., (1906), 97; Surc., Gen. Ins. Fasc. 175, 145.

indiana, Ricardo

Melissomorpha indiana, Ric., Proc. Zool. Soc. Lond., (1906), 98,[1] (1906); Surc., Gen. Ins. Fasc. 175, 146, tab. iii, 12a. — Darjiling[1]

10. Chrysops, Meigen

KEY TO THE INDIAN SPECIES OF *CHRYSOPS*.

[adapted from Ricardo].

1. Wings with a dark transverse band and an apical spot	2
Wings with a dark transverse band but no apical spot	*flavicinctus* Ric.
2. Wings with a hyaline sinus in the band in 5th posterior cell	3
Wings with no hyaline sinus in band in 5th cell	8
3. Abdomen yellowish, with black stripes .	4
Abdomen black, whitish or yellowish at base	7
4. Discal cell hyaline	5
Discal cell not hyaline	6
5. Abdomen with four long black stripes .	*mlokosiewiczi* Big.
Abdomen with a black bifid stripe on 2nd. segment	*flavipes* Big.
6. Abdomen with short, black, bifid stripe on 2nd. segment, often extending to 3rd. or 4th	*dispar* Fb.

Abdomen with bifid stripe on 2nd. segment, and a network of black markings on 3rd., leaving only three yellow spots free	*designatus* Ric.
Abdomen black, 2nd segment yellowish on fore border. Face blackish. Apical border of wing band straight . .	*pellucidus* Fb.
1st. abdominal segment yellow, with median black spot 2nd. yellow, 3rd. blackish, yellow at sides and with 3 yellow spots. 4th.-6th. segments black. Face black. Transverse band of wing irregular on both borders .	*pettigrewi* Ric.
A clear spot in discal cell. Abdomen blackish with pale spots . . .	*stimulans* Wlk.
No clear spot in discal cell . . .	9
Abdomen yellow, 2nd. segment with a black bifid stripe	*indianus* Ric.
Abdomen yellow, with a black band in the middle	10
. Legs and face blackish	*fasciatus* Wd.
Legs and face yellowish brown . .	*fixissimus* Wlk.

Chrysops, Meig., Nouv. Class., 23, (1800); *id*, Illig. Mag, 267, (1803); Ric., A. M. N. H., (7) ix, 366-381, 424-431, [notes on Oriental spp.], *id.*, R. I M., iv, 374-7, [key to Oriental spp.]; Kert., Cat. Dipt., iii, 181; Shiraki, Taihoku Expt. Stn. Bull., (1918), 22-25; Patton & Cragg, T. B. Med Ent., 290-1, [key to Oriental spp.]; Krob, Zool. Jahrb, Syst, xliii, 41-160, 12 figs., tabs. i, ii: Hofim., Arch. Schiffs. Trop. Hyg., xxvi, 244-8, fig, [medical importance], Surc, Gen. Ins Fasc. 175, 148-9, [bionomics].

signatus, Ricardo.

Chrysops designata, Ric, R. I. M, iv, 383-4, tab. xv, 1[1], (1911); *id.*, loc. cit., Sarah (Nepal)[1], [3] Jaulasal (Naini Tal Dis

Belgachia (Bengal)
Bankura
Margherita (Assam)
Sidapur (Coorg)
Virajpet (Coorg)
Dalhousie
Pollibetta (Coorg)
Palur (Madras Pres.)
Coimbatore
Pyinmana (C. Burma)
Taliparamba (N. Malabar)
Ernad (S. Malabar)
Kasargode (S. Kanara)

Chrysops bifasciata, Macq., Dipt. Exot., I, i, 161, (1838)[17];
Chrysops bifasciatus, Wulp, Cat. Dipt. S. Asia, 65; Kert., Cat. Dipt., iii, 182.
Chrysops impar, Rond., Ann. Mus. Civ. Genoa, vii, 460, (1875).
Chrysops ligatus, Wlk., List Dipt. B. M., i, 195[18], (1848); Big., T. A. S. B., lx, 264; Wulp, Cat. Dipt. S. Asia, 65.
Hæmatopota lunatus, Gray in Griff., Cuvier Règ. Anim., xv, 696, tab. cxiv, 4, (1832).
Chrysops semicirculus, Wlk., List Dipt. B. M., i, 196[19], (1848); Big., T. A. S. B., lx, 264, Wulp, Cat. Dipt. S. Asia, 65; Kert., Cat. Dipt., iii, 196; Ric., A. M. N. H., (7) ix, 375.
Chrysops terminalis, Wlk., List Dipt. B. M., i, 195[20], (1848), Big., T. A. S. B., lx, 264; Wulp, Cat. Dipt. S. Asia, 65.
? *Chrysops flaviventris*, Macq., Dipt. Exot. supp. i, 44[21], (1845), Wlk., List Dipt. B. M., v, supp. i, 292; Big., T. A. S. B., lx, 264, Wulp, Cat. Dipt. S. Asia, 65; Kert., Cat. Dipt., iii, 187; Ric., A. M. N. H., (7) ix, 373, *id.*, R. I. M., iv 396; Surc., Gen. Ins. Fasc. 175, 151.

Siam[9]
Annam[9]
F. M. S.[9, 10]
Sumatra[4, 5, 9, 12]
Java[2, 3, 4, 8, 9]
Borneo[5, 17]
Philippines[4]
Hong Kong[9, 12]
Formosa[9, 11]

fasciatus, Wiedemann.

Chrysops fasciatus, Wd., Dipt. Exot., 103, 3[1], (1821); *id.*, Ausser. Zw. fl. Ins., i, 198, 5; Wlk., List Dipt. B. M., i, 197; *id.*, *loc. cit.*, v, supp. i, 291 66; Bld., Naturkund. Tijd. Ned. Ind., xv i, 81; Wlk., Proc. Linn. Soc. Lond., iv, 108, 38; Wulp, Cat. Dipt. S. Asia, 65[4]; Ric., A. M. N. H., (7) ix, 375; Kert., Cat. Dipt., iii, 186; Surc., Gen. Ins. Fasc. 175, 151. — Sibsagar (Assam)[2], Andaman Is[3], F. M. S.[4], Amboina[3, 4], Java[1, 3], Borneo[3, 4]

Chrysops fasciata, Ric., R. I. M., iv, 391 2, tab. xi, 7[1].

fixissimus, Walker

Chrysops fixissimus, Wlk., Proc. Linn. Soc. Lond., i, 112, 37[1], (1856); Wulp, Cat. Dipt. S. Asia, 65; Kert., Cat. Dipt., iii, 187; Ric., A. M. N. H., (7) ix, 376; Pratt, Jo. Trop. Vet. Sci., iv, 390-4[3], [F. M. S. distribution]; Surc., Gen. Ins. Fasc. 175, 151. — Trincomali (Ceylon), F. M. S.[3], Borneo[1, 2, 4]

Chrysops fixissima, Ric., R. I. M., iv, 392-3[2].

Chrysops testaceovillosus Meq.

Chrysops unizonatus, Rond., Ann. Mus. Civ. Genoa, vii, 459[4], (1875); O. S., Berl. Ent. Zeit., xxvi, 97.

flavipes, Meigen

Chrysops flavipes, Meig., Klass., i, 159, 3, tab. ix, 12[1], (1804); Villen., Ann. Soc. Ent. Fr., lxxiv, 310, 6; Kert., Cat. Dipt., iii, 187[2]; Ric., R. I. M., iv, 397[3]; Surc., Gen. Ins. Fasc. 175, 151. — Baluchistan[3], Asia Minor[2, 4, 6], C. & S. Europe[1, 5, 6]

Chrysops flavipes var. *ashkhabadensis*, Szil. Arch. f. Naturg., 111[1], (1916).

Chrysops perspicillaris, Lw., Neue Beitrag., iv, 25 5[5], (1856); *id.*, Verh. Zool. bot. Ges. Wien, viii, 663; Schin., F. Austr., i, 41; Gob., Mem. Soc. Linn. Fr., 1866, 43; Pand., Rev. Ent., ii, 223; Grill., Boll. Mus. Zool. & An.

comp., Torino, x, no 218 6; Ric., A. M. N. H, (7) ix, 426, 430; Aust, Bull. Ento. Res, xvi, 8[6].

avocinctus, Ricardo.

Chrysops flavocinctus, Ric., A M. N. H., (7), ix, 380[1], (1902); Kert, Cat. Dipt., iii, 187, Pratt, Jo. Trop Vet. Sci., iv, 390-4[2], [F. M. S. distribution]; Lefroy, Pusa Bull. 7, 24[3]; Surc, Gen. Ins. Fasc. 175, 151.

Chrysops flavocincta, Aust., Bull. Ento. Res., xii, 431[4]; Ric., R. I. M., iv, 395-6, tab. xv, 4[5]; S W, Mem Dept. Agric. Ind., vii, 107[5].

Khasia Hills (Assam)
Trincomali (Ceylon)[1]
Travancore[5]
Mohnyin (U. Burma)
Lebong (Darjiling)
Gauhati
Pakokku (Burma)
Malwun (Burma)

Borneo[1]
F. M. S.[2]
Siam[4]

indianus, Ricardo.

Chrysops indianus, Ric., A. M N. H, (7) ix, 379[1], (1902), Kert, Cat. Dipt, iii, 189; Surc., Gen. Ins Fasc 175, 152.

Chrysops indiana, Ric., R. I. M., iv, 390-1[1].

Nilgiri Hills[1], [2]
Khasia Hills[1], [2]

mlokosiewiczi, Bigot.

Chrysops mlokosiewiczi, Big., Ann. Soc. Ent. Fr, (5) x, 146[1], (1880); Ric., A. M. N. H., (7) ix, 378; Kert., Cat. Dipt, iii, 191[2]; Ric, R I M, iv, 378-9[3] 401[4], Shiraki Taihoku Expt. Stn. Bull (1918), 25-35, tab i, 3[5]; Ric, Bull. Ento. Res., vi, 407[6]; Kröb, Zool. Jahrb. Syst, xliii, 128-9, tab. ii, 55[7]; Surc., Gen. Ins. Fasc. 175, 153.

Chrysops iranensis, Big, Mem. Soc. Zool. Fr., v, 602[8], (1891)

Chrysops striatus, Wulp, Leyden Mus. Notes, vii, 79[9], (1885); *id.*, Cat. Dipt. S. Asia, 66; Ric., A. M. N H., (7) ix, 379, Kert, Cat. Dipt, iii, 197.

Yunnan[4]

? Caucasus[1], [2]
? Persia[1], [2], [8]
Chusan Archip[3]
Amoy (China)[3], [9]
Formosa[5]
Hong Kong[6]
S. Ussuri[7]

pellucidus, Fabricius.

Chrysops pellucidus, Fb., Syst. Antl, 113. 11[1], (1805), Wd., Dipt Exot., 107. 8, *id.*, Ausser. Zweifl. Ins., i, 206; Wlk.,

Tranquebar
Trichino.
[Coimbatore

List Dipt. B. M., i. 200 ; Kert., Cat. Dipt., iii, 194 ; Big. T. A. S. B., lx, 264 ; Ric., A. M. N. H., (7) ix, 373 ; Surc., Gen. Ins. Fasc. 175, 154. — Coonoor Amlapuram (Coimbatore Dist.) Angul]

Chrysops pellucida Ric. R. I. M., iv, 386-7, tab. xv, 2[2].

pettigrewi, Ricardo.

Chrysops pettigrewi, Ric., A. M. N. H., (8) xi, 452[1], (1913) ; [Surc., Gen. Ins. Fasc. 175, 154. — Manipur[1]

stimulans, Walker.

Chrysops stimulans, Wlk., Ins. Saunds., i, 73[1], (1850) ; *id.*, List Dipt. B. M., v, supp. i, 265, Big., T. A. S. B., lx, 264 ; Wulp, Cat. Dipt. S. Asia, 65 ; Kert., Cat. Dipt., iii, 197 Lefroy, Pusa Bull. 7, 24[3] ; Ric., A. M. N. H., (7) ix, 376, *id.*, R. I. M., iv, 389-90, tab. xv, 5[2]; Fletcher, Pusa Sci. Repts., (1915-16), 80, [bionomics] ; *id.*, *loc cit.*, (1916-17), 96, [oviposition] ; Patel, *loc. cit.*, (1919-20), 97, [parasites] ; Surc., Gen. Ins. Fasc. 175, 154. — 'India '[1], [2] Pusa[2], [3]

INDEX TO GENERA.

INDEX TO SPECIES.

R

rhizophora, Hæmatopota
ricardoae, Hæmatopota
ruralis, Hæmatopota
rubicundus, Tabanus
rubida, Hæmatopota
rubidus, Tabanus
rufa = taprobanes, Corizoneura
rufiventris, Tabanus
rufocallosus = striatus, Tabanus

S

salvazai = nephodes, Tabanus
sanguineus = rufiventris, Tabanus
semicirculus = dispar, Chrysops
sexcinctus, Tabanus
speciosus, Tabanus
stimulans, Chrysops
striatipennis, Hæmatopota
striatus, Tabanus
striatus = mlokosiewiczi, Chrysops
subcallosus, Tabanus
subcinerascens, Tabanus
subhirtus, Tabanus
sufis, Tabanus

T

taprobanes, Corizoneura
tenebrosus, Tabanus
tenens, Tabanus
terminalis = dispar, Chrysops
tessellata, Hæmatopota
testaceiventris = fixissimus, Chrysops
trichinopolis = macer, Tabanus
trihommata, Tabanus
"tropicus" Tabanus
tuberculatus, Tabanus

U

umbrosus = rubidus, Tabanus
unizonata, Hæmatopota
unizonatus = fixissimus, Chrysops

V

vagus = rubidus, Tabanus
vulpes = longirostris, Corizoneura
virgo, Tabanus

W

wyvillei, Tabanus

MGIPC—M—IV-2-82—294-1117—350.